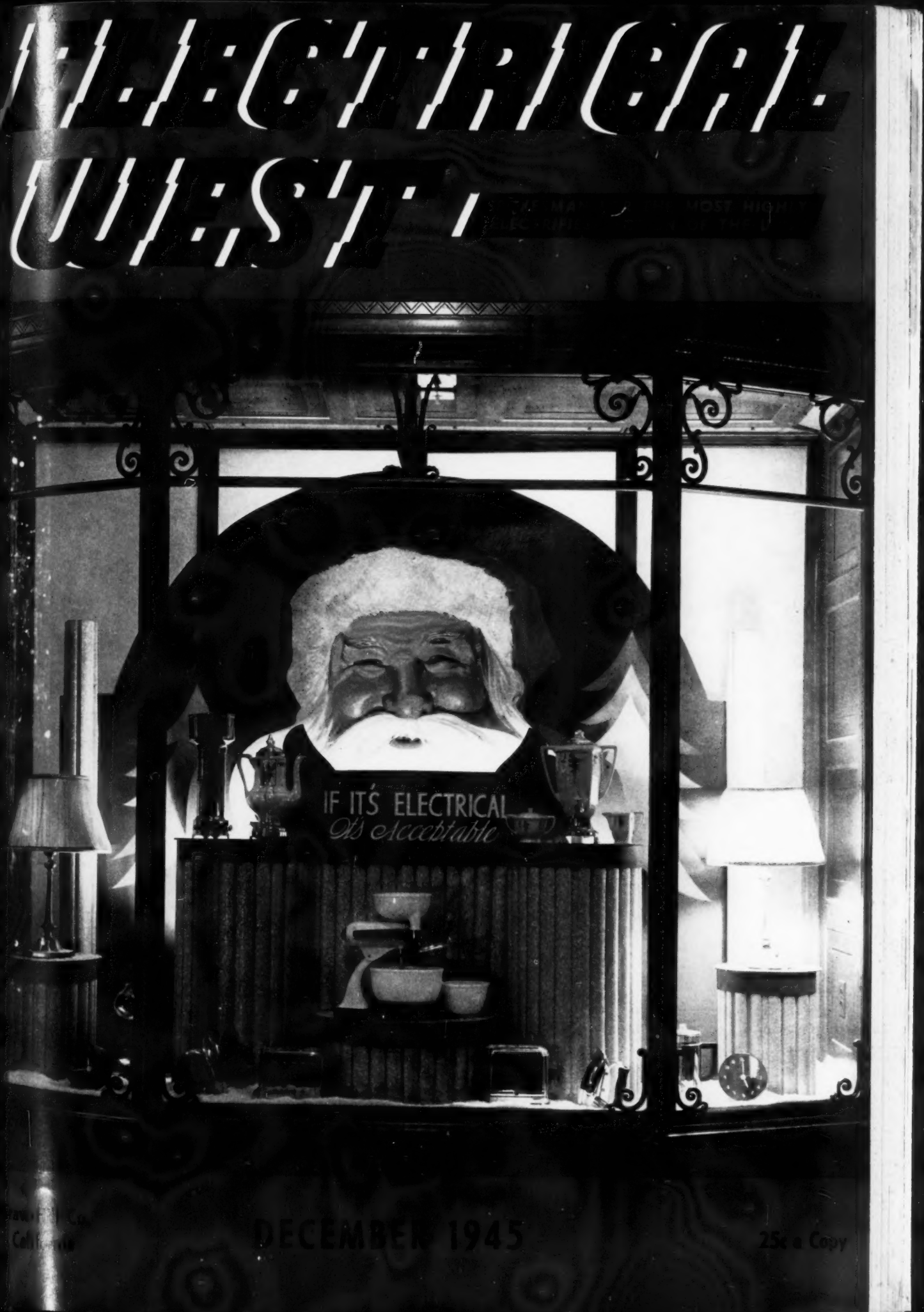
ELECTRICAL WEST



DECEMBER 1945

25¢ a Copy

ELECTRIC BLANKETS AGAIN AVAILABLE
"BACK IN TIME FOR CHRISTMAS GIVING!"
Electrical Times
Nov + Dec 1945
FOR CHRISTMAS AND VICTORY
The outdoor lights will shine again this holiday season as Southern and Central California returns to the happy peacetime tradition of celebrating Christmas out-of-doors with light.
LOSEE
JEWELRY
I'M HELPING TO SELL AT THIS WHITTIER JEWELRY STORE!
"12 Years old in January!"
12 YEARS OF
ELECTRICAL SELLING

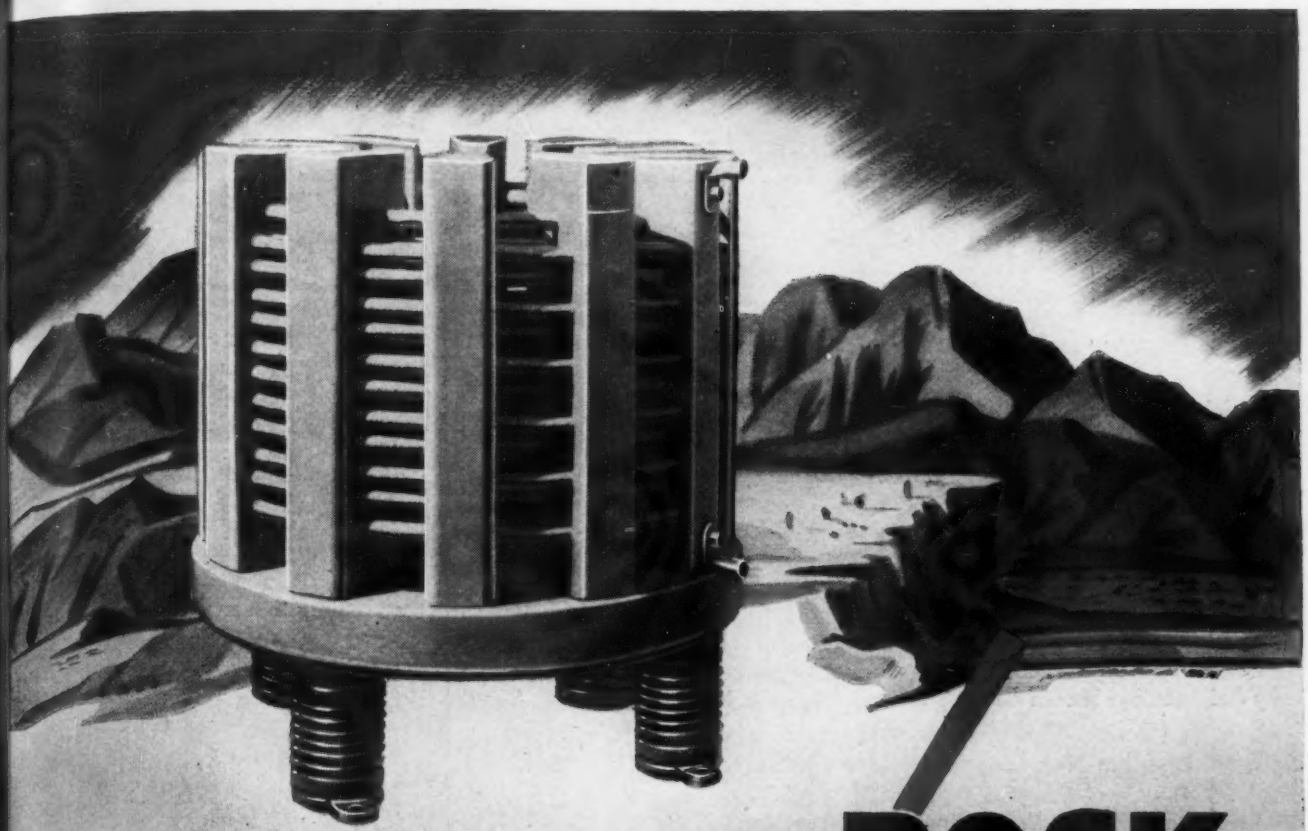
ELECTRICAL TIMES, the Edison Company's popular customer magazine, will have twelve candles on its birthday cake with the publication of the next issue in January, 1946.

For twelve years, *Electrical Times* has helped build the Southern and Central California market for electrical appliances and services. Reaching nearly 400,000 Edison customers each issue, its influence has helped make the homes, farms, stores and industries of this area more highly electrified than in most other parts of the country.

In 1946 as in past years, *Electrical Times* will continue to help electrical appliance dealers and manufacturers sell their products.

SOUTHERN CALIFORNIA EDISON COMPANY LTD

ELECTRICAL WEST (with which is consolidated The Journal of Electricity), December, 1945. Vol. 95, No. 6. Published monthly by the McGraw-Hill Company of California, 68 Post Street, San Francisco, 4, Calif. Entered as second class matter at the post office at San Francisco under the Act of March 3, 1879. Additional entry as second class matter at the post office at Los Angeles. Printed in U. S. A. Subscription rates: U.S., U.S. Possessions and Latin American Republics: $2, 1 year; $3, 2 years; $4, 3 years. Canada: $2.50, 1 year; $4, 2 years; $5, 3 years. Other countries: $3, 1 year; $5, 2 years; $6, 3 years. Single copy, 25c. Copyright, 1945. McGraw-Hill Company of California. All rights reserved.



Solid as a ROCK

. . . AND JUST AS WEATHER RESISTANT!

An installation of 120-kva cast-in-concrete reactors made in 1925, each giving a 3 per-cent reactive drop in a 22,000-volt 3-phase circuit.

Cast-in-concrete reactors in metal enclosure, where the degree of reliability required warrants shielding from external causes of failure.

CAST-IN-CONCRETE CURRENT-LIMITING REACTORS

Service records of thousands of G-E reactors prove that CAST-IN-CONCRETE CONSTRUCTION is hard to beat for mechanical and electrical strength, non-inflammability, resistance to weathering.

1. STRENGTH—Conductor and concrete become a one-piece structure, having strength and rigidity to withstand short-circuit magnetic forces.

2. HIGH FLASHOVER VOLTAGE—Good clearances, elimination of through bolts, use of asbestos conductor covering, and large porcelain insulators give maximum assurance against flashover between turns and layers, and against flashover of complete unit to ground.

3. LONG SERVICE LIFE—Materials used in these reactors are selected by G.E. especially for weatherproof qualities. All are fireproof and practically imperishable, making possible a co-ordinated design having both an excellence of performance and extraordinarily long life. Special treatment during finishing process renders them highly moisture resistant.

4. FOR DIVERSE REQUIREMENTS—G-E cast-in-concrete reactors may be obtained in either single- or three-phase designs, and in a number of arrangements to meet installation requirements for indoor and outdoor service. They can also be obtained with metal-clad construction (steel cabinet) to match switchgear equipment.

For details, ask your local G-E representative or write for Bulletin GEA-976B. *Apparatus Dept., General Electric Company, Schenectady 5, N. Y.*

GENERAL ELECTRIC

401-36-5185

ELECTRICAL WEST

VOL. 95 DECEMBER, 1945 NO. 6

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Cover photo: Appliance displays, like this prewar Christmas window in the lobby of the Southern California Edison Co.'s general office building at Los Angeles, may be seen again this holiday season. It was designed by Ray Fischer, manager of Edison's display department.

CHANGE OF ADDRESS

Circulation Manager,
Electrical West,
68 Post St.
San Francisco 4, Calif.

Please change my address

From .....

To .....

Signed .....

People

John A. Miller

was for a number of years editor of McGraw-Hill's *Transit Journal;* was managing editor, then editor, of the old *Electric Railway Journal,* before the name was changed. When *Transit Journal* was discontinued in 1942, he became a consultant on transportation matters, with headquarters in New York. He writes on p. 77 of electric transportation as a load builder.

H. S. Dusenbery

who writes of electronic tube types, p. 86, is in the electrical department of Moore Dry Dock Co. His daily contacts with electrical men have shown that confusion exists in regard to the trade names given electronic tubes, he says, and the article was written with the hope of helping to clear away this confusion.

O. B. Falls

author of the article, *Distribution System Economics,* p. 80, is with General Electric's central station engineering division at Schenectady. He wrote the paper originally for presentation at meetings of the PCEA in San Francisco and Los Angeles.

M. Kennedy Bliss

is electrical engineer for the Board of Fire Underwriters of the Pacific, San Francisco. He has ample opportunity to evaluate the need for reinspection (of which he writes on p. 96) as compared to original inspection, for he himself must do a great deal of it and finds many situations needing correction for safety's sake.

Preview

Variety for all

will be provided in the contents of the January number. Beginning a new volume, it will mark a welcome return to more ample margins and hence better appearance, made difficult because of close adherence to paper restrictions. A well-balanced diet of pertinent articles and news will be in it too.

This woman has moved mountains

Betty Crocker

SHE WILL MOVE GOODS FOR YOU

Betty Crocker moves merchandise . . . mountains of it. Last year her service to homemakers, backed by consistent, powerful advertising, helped to move 400,000,000 packages of General Mills products into American homes. Betty Crocker and the General Mills Home Service Staff are a prime force behind the sales leadership of Gold Medal Flour, Wheaties, Cheerios, Bisquick and other General Mills products. 9 out of 10 American families use one or more of them.

As the world's best known homemaking authority, Betty Crocker stands as the most powerful single mover of merchandise in any consumer field. The full force of her influence will be solidly and actively behind the merchandising, advertising and selling of General Mills Home Appliances . . . to build new, expanding markets and ever-increasing profit opportunities for you.

COUNT ON GREAT THINGS FROM GENERAL MILLS

General Mills appliances will be different . . . distinctive in appearance . . . new in basic operating principles . . . with patented features that mean extra value and usability for consumers. They'll be backed by a traditionally successful company whose dealers can count on vigorous, aggressive advertising and selling support and constantly growing profits.

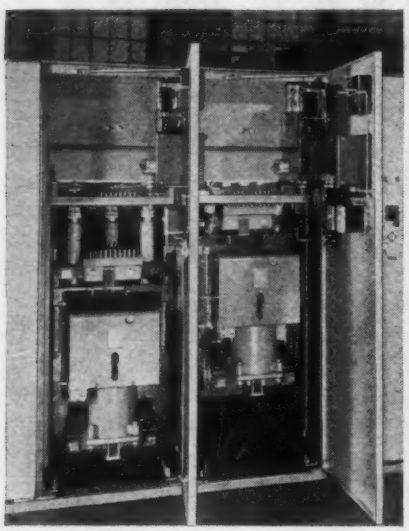
General Mills makes news

BETTY CROCKER IS A REGISTERED TRADE MARK OF GENERAL MILLS, INC.

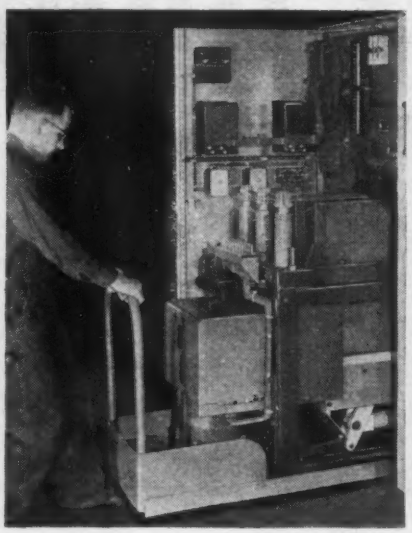
GENERAL MILLS, INC., HOME APPLIANCE DEPARTMENT • MINNEAPOLIS 13, MINNESOTA

See How Easy it Is to

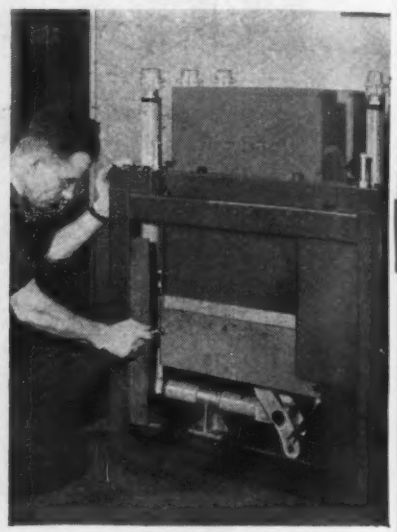
ROUTINE CONTACT INSPECTION IN 3 QUICK STEPS ON OILLESS "RUPTAIR" MAGNETIC AIR BREAKER



1 LOWER BREAKER.
Photo shows "Ruptair" magnetic air breaker in operating position (at right) and in the lowered disconnect position. The breaker is easily lowered with manually or electrically operated crank-hoist.



2 WITHDRAW BREAKER.
In disconnect position, the "Ruptair" breaker can be placed on a transfer truck, and pulled out into the aisle. For safety, shutters to isolate disconnect contacts are automatic in operation.



3 REMOVE SIDE PLATES.
Finally, light-weight insulating barriers are removed, each barrier being held in place by two cap-screws. Since the arc chute is above the contacts, it need not be disturbed for contact inspection.

AS A MODERATE capacity, oilless circuit interrupter, the "Ruptair" breaker is gaining increased popularity among operators. Elimination of oil means many more repetitive operations without maintenance . . . reduced fire hazard . . . less danger from breaker failure.

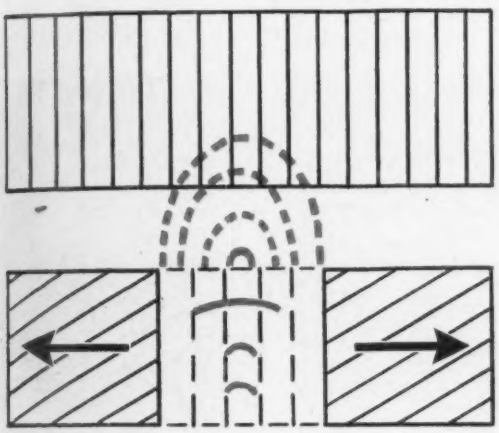
In addition to these advantages, and simplest inspection of any magnetic air breaker, the "Ruptair" breaker combines space saving vertical lift construction with horizontal contact separation, shown at top of opposite page. "Ruptair" circuit breakers are built in standard ratings of 5 kv and below, 150,000 kva interrupting capacity and below, for installation in metalclad switchgear, cells, or cubicles. To get the full story, write Allis-Chalmers, Milwaukee 1, Wis.

HEAR THE BOSTON SYMPHONY: *Saturday, American Broadcasting Co.*

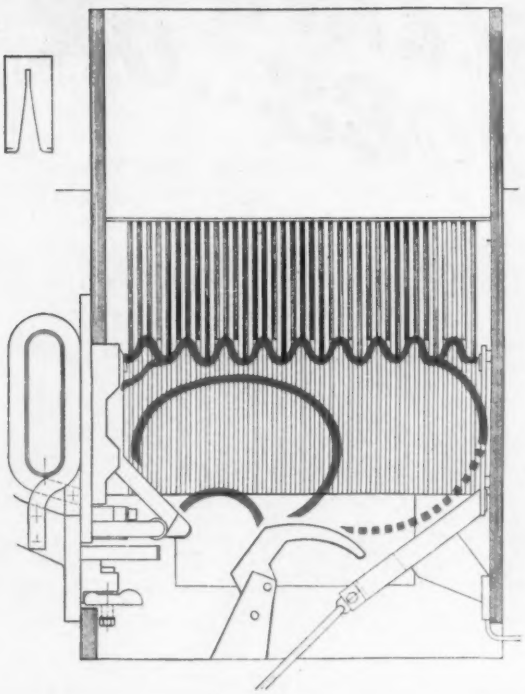
Inspect

A "RUPTAIR" MAGNETIC AIR CIRCUIT BREAKER

WITH HORIZONTAL SEPARATION OF BREAKER CONTACTS, MAINTENANCE AND OPERATION ARE SIMPLIFIED



SINCE THE ARCING contacts on a "Ruptair" magnetic air circuit breaker are separated in the horizontal direction, natural thermal effect assists the arc into the arc chute . . . no complex interrupting structure is required! Position of arc chute *above* contacts makes it possible to inspect contacts without removing the chute. Maximum interrupting effectiveness is achieved in the "Ruptair" circuit breaker, without departing from ideal simplicity of design.



RUPTAIR BREAKER HAS UNIQUE DESIGN

THE RUPTAIR breaker depends for its high efficiency throughout interrupting current range on several design factors . . . coordination of horn-shaped moving contact and arc runner for quick transferral of the arc . . . establishment of a strong magnetic field in the breaker before actual contact separation . . . and special design of the arc chute.

Why Allis-Chalmers offers all 3 types of Circuit Breakers

☛Ever hear of "special theater modifications"? That's a military term, and refers to the adaptation of aircraft to unusual flying conditions, such as are encountered in Central Alaska, or in torrid tropical climates.

☛An airplane built for special theater operations often differs in practically every detail from a plane designed for duty under normal atmospheric conditions. That is, the Army and Navy have learned that *one* type of plane can't function in *all* theaters of war!

☛*For the same reasons, Allis-Chalmers engineers know that one type of circuit breaker won't do the job in all the varied environments encountered in industry.*

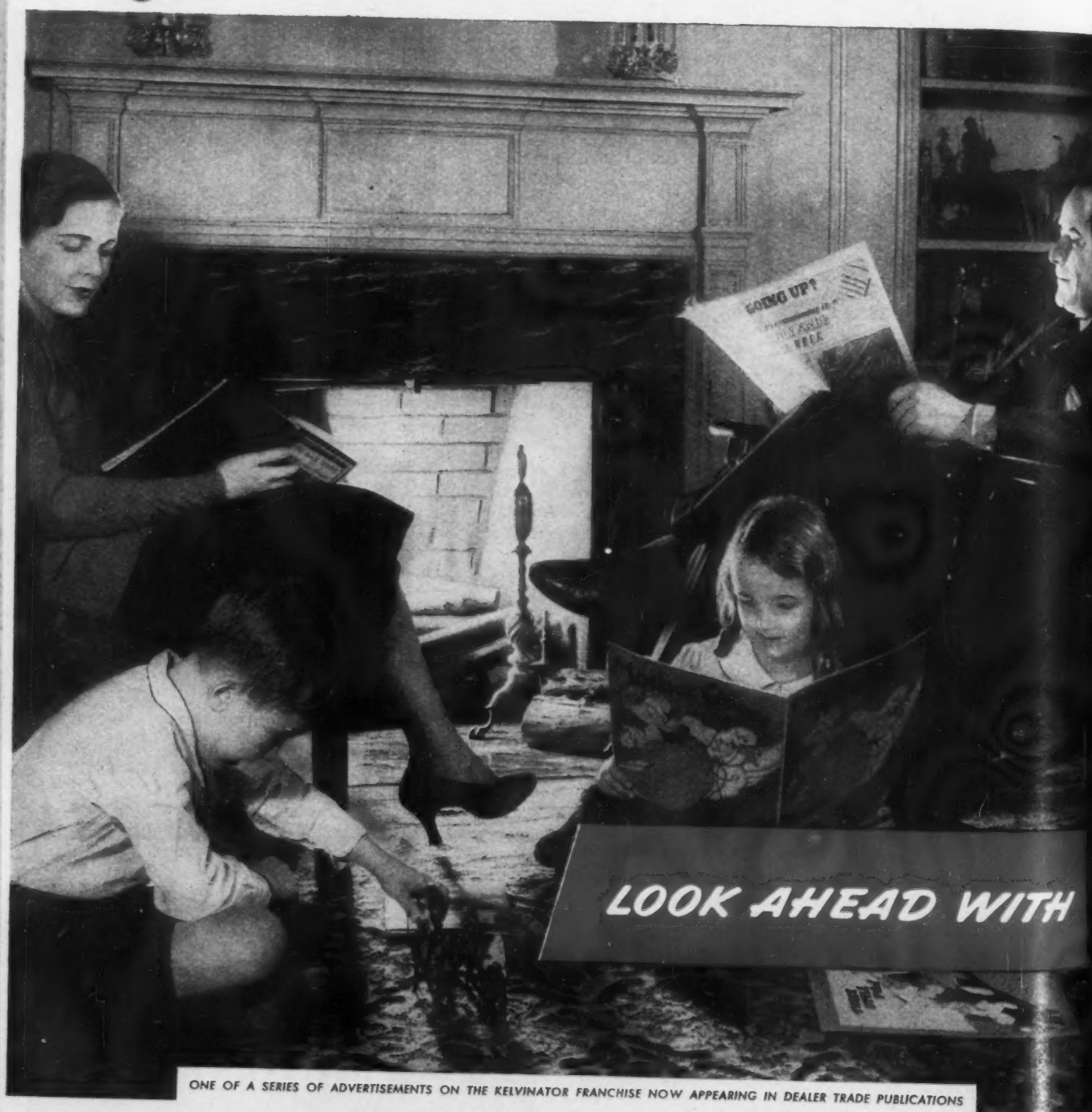
☛Therefore, it is an Allis-Chalmers switchgear policy to offer *all three* basic types of circuit interruptors — oil, magnetic air, and air blast breakers — for unrestricted customer choice. Neither by price penalties, or any other means, does Allis-Chalmers seek to coerce buyers into selecting any *one* type of breaker.

☛Thus the customer has a means of expressing his circuit breaker preference, based on intimate knowledge of local operating conditions. And indirectly, through the medium of free choice, he influences the future trend of switchgear development. A 1863

ALLIS-CHALMERS
MILWAUKEE

WHAT WILL YOU OFFER YOUR SALESMEN

SELLING JOBS... OR A VOCATION IN SALES



ONE OF A SERIES OF ADVERTISEMENTS ON THE KELVINATOR FRANCHISE NOW APPEARING IN DEALER TRADE PUBLICATIONS

hese are the alternatives that every dealer must cognize as he plans and builds his sales nization today . . .

can give a man just another selling job . . . or he bring to *all* his men—to *himself*—the opportunity building a real *vocation in sales*. He can throw ether a flash organization or he can create a solid iness—a substantial, long-range institution that serve his community—and *him*—through many tually profitable years.

It is the purpose of Kelvinator's Retail-Minded Program to build both for now *and* the future . . . to assist the retailer who wants the security, the respect, the faith and good will that come to him who builds on firm foundations. This is Kelvinator's program, evidenced not only in its Selective Distribution Pattern, its Product and Pricing Policies, its Point-of-Sale Merchandising—but in the help, too, that Kelvinator extends to retailers through the most advanced and effective training and business development program ever to come from the appliance industry: Kelvinator's great *Vocation-in-Sales* Program!

Initiated in September, 1944, *Vocation-in-Sales* grew out of Kelvinator's Retail Sales Management Forum, in which Kelvinator sales executives, together with retail sales executives from department, chain, furniture and appliance stores, explored the whole field of retail selling. In its final form—as checked, supplemented and fortified by the technical research of leading vocational authorities—Kelvinator's V.I.S. Program provides retailers with a scientific method for attracting, selecting and developing men who are qualified to succeed as salesmen, whether or not they have had previous experience.

Illustrated on this page are two of the booklets developed as a part of the V.I.S. program's first two phases: *attracting* and *selecting* salesmen. Following these, Kelvinator will bring to the retailer—as just another part of his Kelvinator Franchise—basic instruction for his salesmen, both in selling techniques and product training, in schools conducted by Kelvinator; a planned program for periodic introduction of new and refreshing selling tactics, brought to the store by Kelvinator Zone and Distributor District Managers; and a planned series of materials and methods for retailer's use in conducting his own sales training meetings.

This is Kelvinator's answer to the question: Selling jobs . . . or a *vocation in sales?*

Covering the two opening phases of Kelvinator's great "Vocation-in-Sales" Training Program, these two booklets will help Kelvinator Retailers to attract and select the right salesmen.

The most Valuable Franchise in the Appliance Industry

RETAIL-MINDED

Kelvinator

DIVISION OF NASH-KELVINATOR CORPORATION

Kenosha • Milwaukee • DETROIT • Grand Rapids • Lansing

N-K MUSICAL SHOWROOM

Nash-Kelvinator's *new* hit musical show, with the Andrews Sisters, Curt Massey and Guest Stars—*every Wednesday evening at 10:30 P. M., E. S. T.—Columbia Broadcasting System.*

Write FOR YOUR COPY OF THIS VALUABLE CHIMES MERCHANDISING BROADSIDE today!

NATIONAL MAGAZINES
. . . to tell the Rittenhouse Chime story to millions of America's consumers—wherever they live.

SUNDAY NEWSPAPERS
. . . advertisements in leading key-city Sunday Magazines—for immediate sales volume.

EXPERTLY DESIGNED DISPLAYS
. . . for sales-floor, window and counter use. Colorful, compelling and prospect-stoppers.

Here's the ALL STAR

RITTENHOUSE CHIME MERCHANDISING STORY . . .

RITTENHOUSE—top name in the electric door chime industry—has stepped on the starter! Production of those models which will have the widest and most immediate ready sale because of their design and price appeal is going ahead at full speed. Other models will be made available just as rapidly as maximum production effort permits.

Never before have electric door chime sales prospects reflected such glowing profit opportunities for electrical appliance wholesalers and dealers—*in every community*. And, timed perfectly to your sales efforts, millions are already seeing the strong, consumer-attracting Rittenhouse advertisements in leading National Magazines—and in big-circulation, key-city Sunday Newspaper Magazines.

In words and pictures, the Rittenhouse Broadside tells the story of a skillfully planned, up-to-the-minute merchandising program to make Rittenhouse Chimes the fastest selling, most profitable and appealing line of electric door chimes ever presented.

Expertly engineered to afford new mechanical features that make possible undreamed-of tone richness and backed by the hardest hitting sales and advertising set-up in the history of chime merchandising, Rittenhouse gives you everything that makes for record sales and profits.

Send for this Rittenhouse Broadside now. Note the striking beauty of the ten new 1946 models styled by America's famous designer-stylist Norman Bel Geddes. Go over the important consumer-appealing Rittenhouse mechanical features. Weigh the sales power of the tremendous circulation, prestige-creating publications Rittenhouse is using to help you sell.

Join the Rittenhouse "Parade of Stars." Write us—TODAY.

See the Rittenhouse Chime Exhibit!

★ **NATIONAL HOUSEWARES SHOW** ★

Palmer House, Chicago • December 30th—January 4th

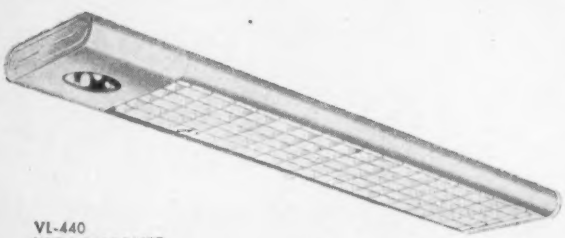
Rittenhouse *America's Finest Chime Signals*

THE A. E. RITTENHOUSE COMPANY, INC., HONEOYE FALLS, NEW YORK

COMPETITION MAKES STORE LIGHTING IMPORTANT... Leader FLUORESCENT FIXTURES FOR BETTER LIGHT MORE PROFITABLE SALES

The days of the bulging consumer pocketbook are gradually yielding to close competition — and that's when you must be ready with the best in store lighting. Leader Fluorescent Fixtures display your merchandise at its best — among the four models illustrated below there is one which will merchandise your products . . . increase your sales and profits. Write for complete specifications and prices.

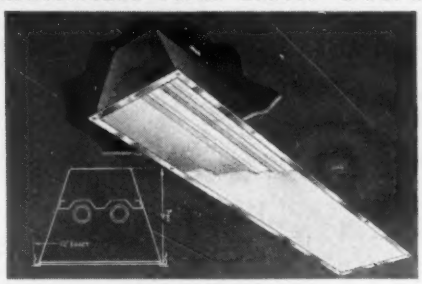
THE *OFFICER* WITH *DIRECLITE* FOR MERCHANDISE "SPOT" LIGHTING



VL-440
WITH DIRECLITE

Smart, wafer thin, a beautiful Fluorescent Fixture that will add to the appearance of the establishment as well as diffused, pleasing, light. . . . The illustration shown above incorporates the *easily attached* Direclite for merchandise spot lighting. VL-440 uses four 40-watt lamps, Length 49½", width 16", depth 3½".

BETTER LIGHTING, HIGH SURFACE BRIGHTNESS AND LIGHT OUTPUT

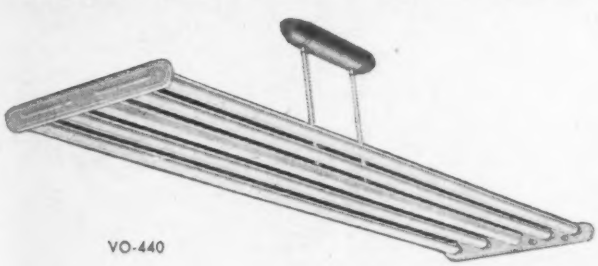


L-440

Wherever maximum wide spread illumination, as well as good looks, are required, this Leader high level open type unit will serve with an efficiency beyond all comparison. Its acceptance for all types of commercial establishments has been universal and enthusiastic. . . . Of heavy steel construction, with chip proof white enamel reflectors and satin aluminum finished hinged end caps, it represents the ultimate in sturdiness and attractive streamlining.

L-440 has four 40-watt lamps. Length 49", width 9½", height 5½". Companion unit L-240, has two 40-watt lamps.

When an Even UPWARD, OUTWARD and DOWNWARD Flow of Light is Needed



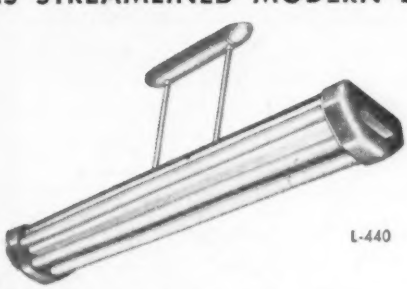
VO-440

When light is needed on shelves, walls and floors as well as on merchandise, here is a moderately priced all steel unit that is precisely engineered to such a task.

Easy to install in single units or in continuous runs, with pendant or ceiling mounting, this four lite, open type, parallel tube fixture stands for real trouble-free performance.

VO-440 uses four 40-watt lamps.
Length 49½", width 16", depth 3⅛".

RECESSED TROFFERLITE GIVES STREAMLINED MODERN EFFECT



L-440

Due to their inherent versatility, "Leader Recessed Trofferlite" units may be economically installed as a replacement system in older buildings, as well as in original architectural plans and remodeling projects.

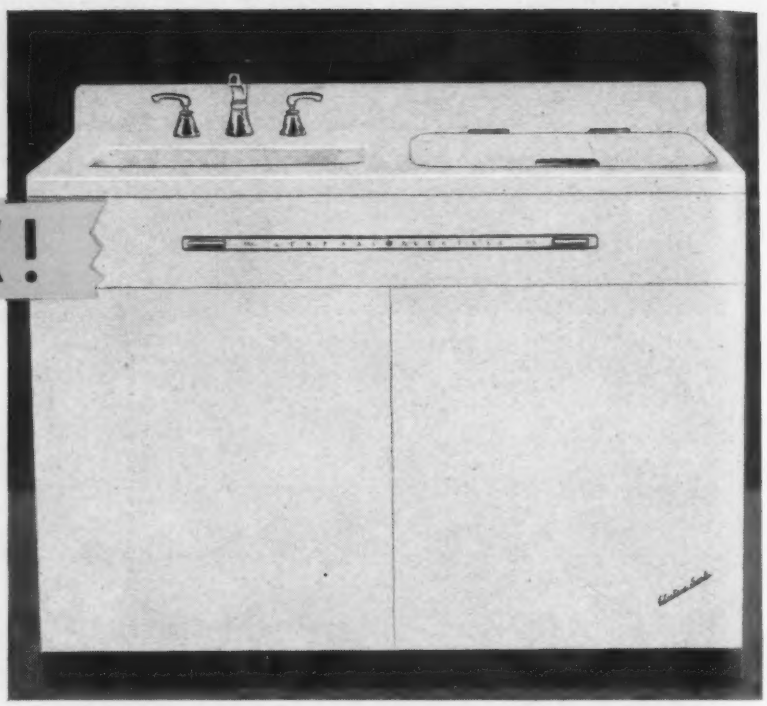
For both large areas, and for the small room, where much improvement is effected by the absence of hanging objects.

12" wide with one or two 40-watt lamps; and
24" wide with two or four 40-watt lamps.
With or without glass panels or louvers.

LEADER ELECTRIC MFG. CORP.
6127 NORTH BROADWAY • CHICAGO 40, ILLINOIS
WEST COAST OFFICE • 2040 LIVINGSTON STREET • OAKLAND 6, CALIFORNIA

"CLEANEST" DEAL ON THE MAJOR APPLIANCE MARKET!

NEW G-E ELECTRIC SINK!



GENERAL ELECTRIC SINK: combination G-E Dishwasher and G-E Disposall

Presents New Sales Opportunities!

Newly streamlined, *completely automatic*, the G-E Dishwasher and Disposall (G-E Electric Sink) save more time around the kitchen than any single other major appliance.

Clean as a whistle—two ways

1. Washes dishes, rinses dishes; they dry in their own heat; disposes of food waste. All electrically, all in a twinkling.

2. Clean dealing, too. No fussing over trade-ins, all brand-new merchandise.

Five models available now: (1) G-E Electric Sink (Dishwasher and Disposall); (2) Sink with Dishwasher; (3) Free-standing Dishwasher; (4) Disposall for installation in present sink. (5) Dishwasher for installation in present work surface.

Backed by TOP AD Campaign

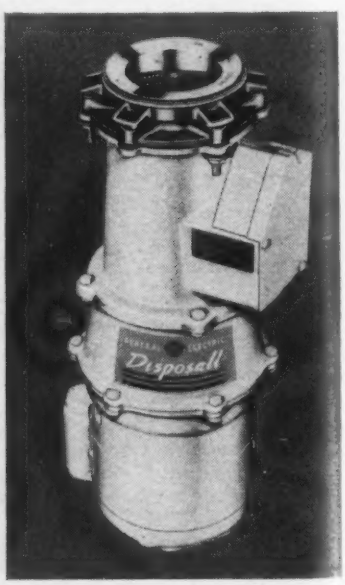
Biggest promotion ever given to such appliance. Twelve times our own prewar advertising!

Ads run in top-circulation consumer magazines: *Life*, *American Home*, *Better Homes & Gardens*, *Parents'*, and *Small Homes Guide*. Plugs, too, on the famous radio show, "The G-E House Party."

The General Electric Co., Appliance & Merchandise Dept., Bridgeport, Conn.

HELP WIN THE PEACE—BUY AND HOLD VICTORY BONDS

LEFT: G-E Free-standing Dishwasher. RIGHT: G-E Disposall



DISHWASHERS AND DISPOSALLS*

*REG. U. S. PAT. OFF.

The complete Table-to-Shelf Dish Job Done Automatically

GENERAL ELECTRIC

FOR GOOD LISTENING: *Don't miss Art Linkletter, in "The G-E House Party," every afternoon, Monday through Friday, 4 p.m., E.S.T., CBS.*

ELECTRICAL WEST Sales Guide

NEWS LETTER FOR THE ELECTRICAL MERCHANT OF THE WEST

December
1 9 4 5
©

Other flashes from our Eastern men and Washington office, plus significant tips from Westerners in the know-----

Take it easy

Dealers who have waited patiently for production lines of major manufacturers to gain momentum so that goods will be available to fill orders being taken now had better be cautious about promises of future deliveries. Labor situation may shut down lines entirely, delaying deliveries for weeks perhaps months.

Steel uncertain

Even if strikes do not affect appliance manufacturers directly, probable steel strike will stop production. Moreover, we hate to say, bottlenecks aren't being broken. Such scarce items as motors, radio tubes appear likely to remain short. Manufacturers are worried because dealers make rash delivery promises; if manufacturer promises delivery in four weeks, some dealers tell their customers two weeks.

Heat's on--or is it?

Important western manufacturer cannot turn out enough air heaters because of scarcity of cord plug caps, for instance. Manufacturers of electrical fittings are unable to make delivery of these small items. Meanwhile the heating season runs along, not waiting for merchandise or men.

Here they stOPA

In radio, Los Angeles manufacturers are stalled. It's OPA troubles with component parts, principally condensers, resistors, speakers, coils and some tubes. With tubes due to cost 11%, speakers 18%, coils 27% more, plus added assembly costs, added costs can't be absorbed, the makers say, and still meet OPA's demand that retail prices stay put.

Watch Quickies

Many dealers, wholesalers are taking a beating from turnbacks on off-brand appliances put out by quickie manufacturers. New or small manufacturers get quick price decision from OPA, often quite favorable because they had no 1941 price, whereas old-line makers must buck time-consuming red tape, usually end up with much lower ceiling. NRDGA exhibit at Washington, D.C., contains many appliance examples of inequities.

Returned from visits to 22 appliance and radio manufacturers in the Chicago area, J. Clark Chamberlain, San Diego Bureau manager, sums up causes for delays as long as to next May before a normal supply can be expected: 1. OPA pricing and dilatory tactics. 2. Strikes, not only such direct ones as on Bendix and Frigidaire, but even the last coal strike and others indirectly affect supplies. 3. Inability of manufacturers to compete for labor against the $20 a week unemployment dole; can't persuade workers to take jobs. 4. Materials: the competition between industries for steel, rubber, castings, etc. 5. Government owned machinery in many plants not out of the way of reconversion.

Five causes

Charges of the radicals that manufacturers are waiting for more favorable taxes is just hay for the donkeys. Competitive strategy of the big companies seems to be Sherman's "be there fust with the most" and all are impatient to flood the market first with their own brands. Some single manufacturers are geared to produce as many radios or refrigerators themselves as were made by the entire industry before the war.

Sherman had a word for it

Westinghouse is beginning to manufacture electric air heaters at its Emeryville, Calif., plant. Under license by Wesix, the Westinghouse heaters will use the former's design principles and thermostatic control by Kircher. Models are to range from 1,250 to 4,000 watts.

Air heat

First with "less than 1942" prices will be Hotpoint's new eight-operations, no soap, dishwasher, which will sell at $198 including tax and transportation instead of $265 without either. It's under production. Hotpoint also has its range and refrigerator prices approved; they are very close to prewar prices, delivered anywhere in the nation.

Price drop

Sampson United, maker of rubber bladed fans and irons, has announced it will sell under Fair Trade agreements in the 46 states which have such laws.

Fair Trade

Pressed Steel Car Co. is the newest entry into appliances. It holds a showing of its Presteline electric range, the first of its products, Dec. 10-11, in Chicago. With young blood, plenty of money and facilities, it aims to become one of the majors in the field.

Cars to appliances

Maytag plans to branch out into gas and electric ranges, a frozen food locker and an automatic washer and clothes dryer. Buying an interest in Globe-American, maker of stoves, the latter will make the ranges and food locker.

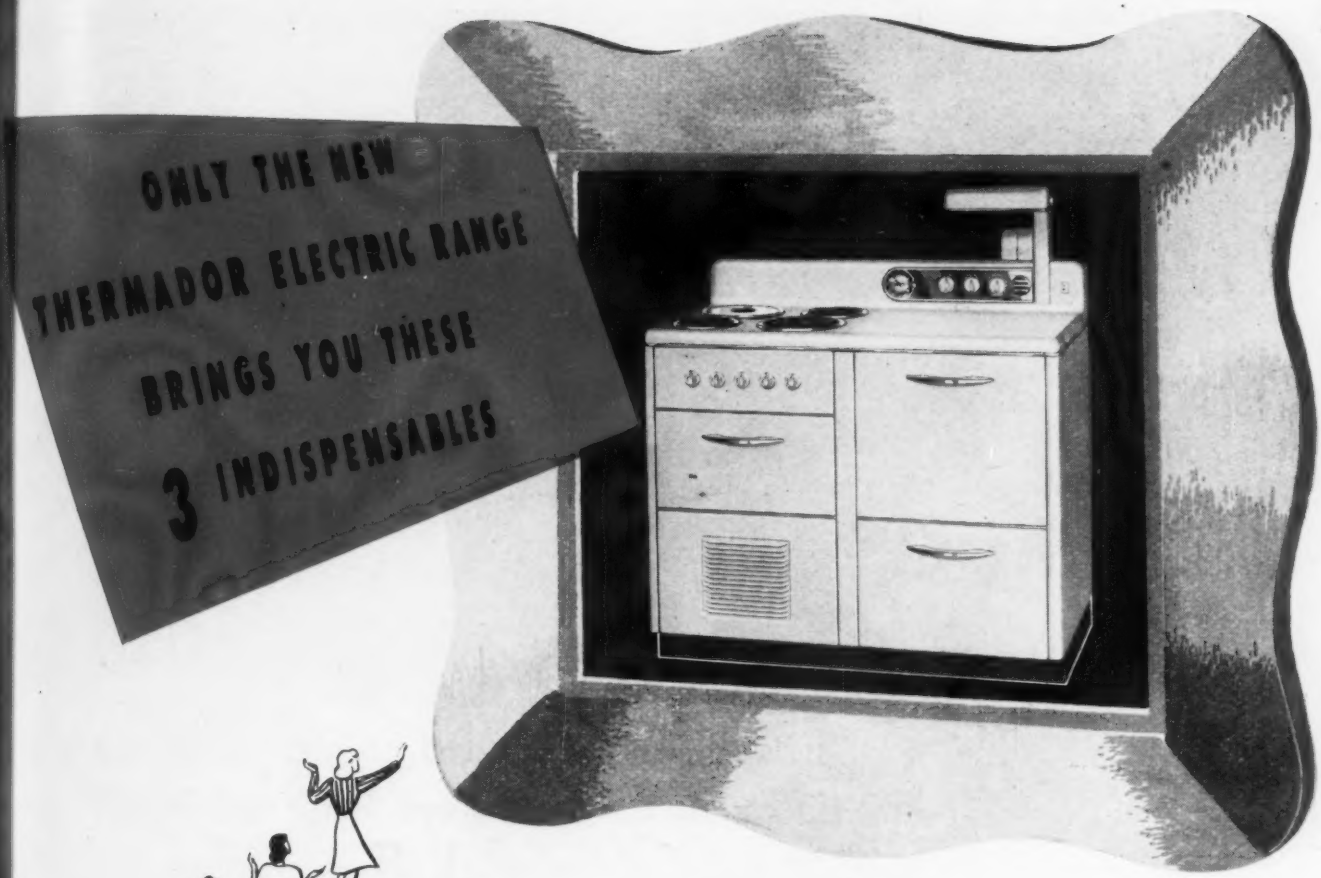
Branching out

F. L. Jacobs Co., now tooling for its automatic Launderall, has also announced a steam iron, coca cola vending machines, and automatic dishwasher and garbage disposal unit for 1946 production.

New ones

Most sensational new combination deal is the Ingersoll complete home building unit which combines household heating, plumbing, electrical, bath, kitchen and laundry elements, including major appliances in one package. Roy Ingersoll is president of a division of Borg-Warner Corp. which plans to make these.

Even the sink



THREE *Exclusive* THERMADOR FEATURES—an oversized illuminated oven which accommodates the largest roaster . . . no-tilt racks that slide easily to a safety stop. 30% more working top-space than ordinary electric ranges—think of what this means in a compact kitchen, the steps it saves in a big one! And, a Heat-Fan built right in the range which quickly *warms* or *cools* your kitchen—as well as offering the added convenience of quick-drying stockings, lingerie and infantswear!

Plus many, *many* other features . . . altogether more efficiency devices than you thought ONE RANGE could have! And it's coming very, *very* soon!

See Your Distributor

THERMADOR Electric Ranges are distributed by Sues-Young Co., Los Angeles; Eoff Electric Co., Portland; Mountain States Distributors, Inc., Salt Lake City; Standard Electric Corp., San Diego; Frank Edwards Co., San Francisco; Herb E. Zobrist Co., Seattle; Mutual Telephone Co., Honolulu, Hawaii.

See your nearest distributor if you'd like to feature this justly famous line of Electric Ranges, as well as the other unusual appliances bearing the THERMADOR name.

Write, phone or wire for details

"Seven Leagues Ahead"

THERMADOR

THERMADOR ELECTRICAL MANUFACTURING CO.

5119 South Riverside Drive • Los Angeles 22, California

COPPERWELD IN-BUILT MESSENGER
COPPER BINDING TAPE CRIMPED TO MESSENGER
OKOPRENE COLOR-CODED PROTECTIVE COVERING
OKOLITE HIGH-VOLTAGE OIL-BASE INSULATION
OKOLOY-COATED COPPER CONDUCTOR

"SELF-SUPPORTING"

. . . a widely-discussed cable construction that's at its all-weather best with OKOLITE - OKOPRENE

Installation is simple because cable and messenger make up an integral unit. Fewer man-hours are needed; entire assembly can be installed in one simple operation. No rings to install, no separate pulling of messenger and cable.

High dielectric strength — wet or dry — is gained by the use of Okolite oil-base insulation. Resistance to sunlight and ozone as well as to oil and chemicals is assured by the tough, bonded sheath of non-flammable Okoprene, made with neoprene. While Copperweld is usually specified, galvanized steel or other messengers can be supplied if preferred. All elements of this cable construction have long life under extreme variations of temperature and weather.

Advantages of OKOLITE-OKOPRENE* Self-Supporting Cables Over Other Aerial Cables

- Less weight
- Easy to tap
- Can be tapped "hot"
- No insulation shielding required up to 5 Kv.
- No ring cutting
- No grade clamps
- No fibrous coverings to rot and festoon
- No lead to crack

Advantages of OKOLITE-OKOPRENE Self-Supporting Cables Over Line Wire

- Slashes costs of tree trimming.
- No overlength poles to clear trees.
- Relieves wire congestion on poles.
- Reduces outages due to limbs or other foreign matter lying across lines.
- Strong messenger protects cable from falling limbs and trees.
- Full insulation permits operation even if poles are down.
- Better appearance.

Feel free to talk over with Okonite engineers the many applications of Okonite's aerial cables for all voltage ranges. The Okonite Company, Passaic, New Jersey.

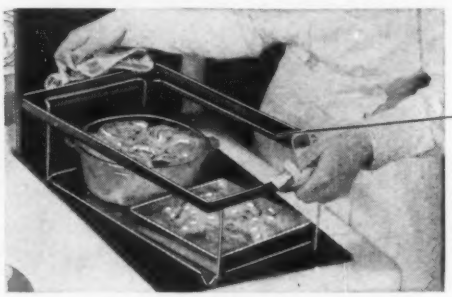
*U. S. Pat. No. 2,312,058

OKONITE insulated wires and cables

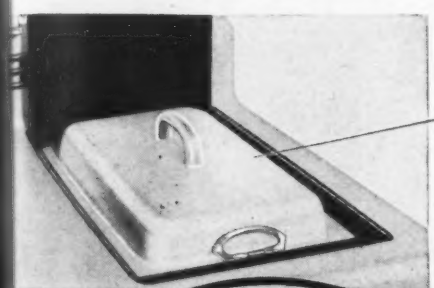
IT MUST BE JUST AS THRILLING TO SELL THIS ROASTER RANGE AS IT IS TO OWN IT !

Monarch DEEP-HEET

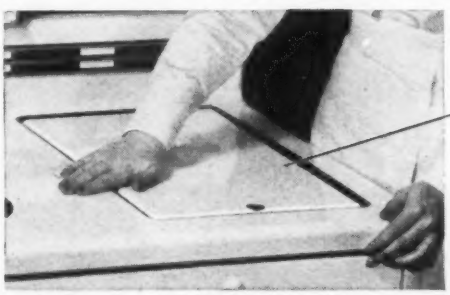
Large surface oven for complete meals, roasts, vegetables and potatoes.



Convenient lifter rack for casserole dishes and other small utensils.



High domed cover to increase depth of roaster for large fowl or for whole ham.



Smooth flat top for working space when roaster is not in use.

If it's a Roaster Range
It's a MONARCH

YES, there's real satisfaction in selling a major appliance that scores such an instant hit with women . . . . and is so completely beyond the reach of competition. "Your electric roaster built right into the top of your electric range." That's an exclusive sales feature that is really making women wait for this range . . . . and hold sales!

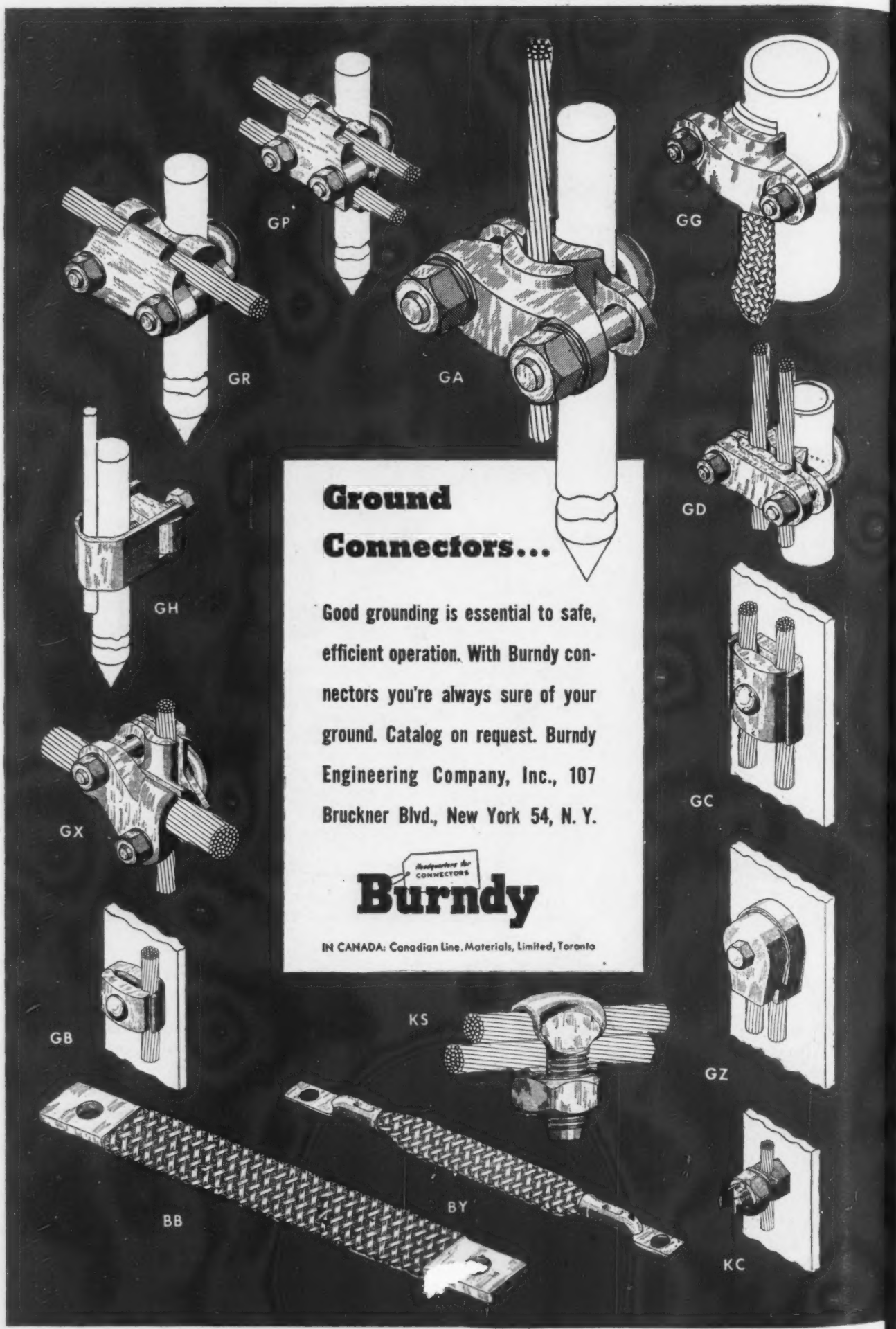
MALLEABLE IRON RANGE CO.

3925 Lake Street — Beaver Dam, Wisconsin

RANGES AND HEATERS

Monarch-Paramount

COAL - WOOD, ELECTRIC, GAS and COMBINATION RANGES



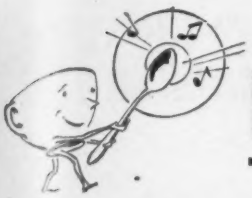
Ground Connectors...

Good grounding is essential to safe, efficient operation. With Burndy connectors you're always sure of your ground. Catalog on request. Burndy Engineering Company, Inc., 107 Bruckner Blvd., New York 54, N. Y.

Headquarters for CONNECTORS

Burndy

IN CANADA: Canadian Line Materials, Limited, Toronto



HERE ARE THE COFFEE MAKERS TO FEATURE IN '46!

The new automatic G-E—the *only* fully automatic glass coffee maker! Also new G-E semi-automatic, and non-automatic models!

Production on G-E's sparkling new coffee makers is speeding ahead! You'll have the *complete* line very soon.

And as a stand-out feature, you'll have the beautiful new G-E Automatic Coffee Maker! Just look at all the wonderful things it does—*automatically!*

Better coffee—just by pushing a button!

No hit-or-miss coffee with the sparkling new G-E Automatic Coffee Maker. Measurements for water are clearly marked on the lower bowl. (An exclusive G-E feature.) The user simply places coffee in the upper bowl, and pushes a button. She can "*set it and forget it!*"

Wonderful brew—2 cups or 8!

The Brew Compensator—an exclusive G-E feature—*automatically* brews delicious coffee, whether 2 cups or 8 are being made! No need to make more coffee than is wanted, for fear small amounts won't taste right.

Coffee stays hot—indefinitely!

After the coffee's "done," a warming heat *automatically* comes on at intervals. Keeps the delicious brew piping-hot until "the family's ready." Late-comers get coffee that's hot, grand-tasting—not flat, reboiled.

Also—Wonderful Values in Semi-Automatic and Non-Automatic G-E Models!

For customers who want a less expensive coffee maker, G-E offers *four* other models, a range model and three electrics including a semi-automatic model.

All have G-E's exclusive Brew Compensator and lower bowl markings. *All* have G-E quality, beauty, and long life!

G-E Automatic Coffee Maker

"G-E Appliances—Most Wanted by Most Women"

GENERAL ELECTRIC

Huge Market Already Sold!

Women everywhere are waiting to buy G-E appliances.

In a recent national survey, 53 out of 100 women said General Electric makes the best electrical appliances for the home. And G-E Coffee Maker advertising is keeping this market very much "alive" for you.

Ads featuring "Better coffee—automatically" have been running regularly in leading women's magazines—will keep on through 1946. "The G-E House Party," a great radio show that's on the air five days a week, tells women from coast-to-coast about the *only* fully automatic glass coffee maker—G-E!

Get your share of this big ready-to-buy market. Be ready to sell G-E Coffee Makers the minute your first shipment arrives! General Electric Co., Appliance and Merchandise Dept., Bridgeport, Conn.

TELL YOUR CUSTOMERS *to listen to Art Linkletter, in "The G-E House Party," every afternoon, Monday thru Friday, 4 p.m., E.S.T., CBS.*

No Shivery Rooms with ELECTROMODES

Warmed Comfortable Air— Wherever You Want It—Instantly

Model PJ-13: Streamlined cabinet harmonizes with modern room furnishings. Attractively finished and equipped with automatic safety switch.

For the bathroom, bedroom, sun-parlor, workroom, nursery, playroom—the quick safe portable Electromode Electric Air Heater provides heat instantly.

Use Electromode anywhere, anytime—in spring and fall when the central heating system is not operating—late at night, or early morning, when extra warmth is needed.

No Hot Wires or Open Glow Safe—No Fire Hazard

These heaters have the same type of high efficiency enclosed aluminum-finned heating elements used in the heaters installed in U. S. Navy Submarines—and essential industrial plants for many years. Safe—no hot wires—no fire hazard. Electromodes are the only heaters incorporating this patented cast-in-one-piece aluminum heating element. Conduction of heat is so efficient that surface of element gets but little hotter than ordinary hotwater radiator.

Cold air is taken off the floor and replaced by fan-circulated down-directed heated air. The heat is distributed in the vital living zone.

Our manufacturing quota is limited this season so get complete details from your electrical wholesaler at once.

ELECTROMODE CORPORATION, Div. American Fdry. Eqpt. Co., 436 So. Byrkit St., Mishawaka, Indiana.

WEST COAST REPRESENTATIVES

SEATTLE, WASH.
Fred W. Carlson
307 Wall St.

SAN FRANCISCO 3, CALIF.
Russell & Co.
1355 Market St.

LOS ANGELES 15, CALIF.
Harry F. Holderman
1106 So. Hope St.

ELECTROMODE *Room Heaters*

Brochure 46-D describes both Portable and Built-in models. Copy mailed on request.

PRODUCTS *that are news*

Refrigerated Cases (1200)

Frigidaire has added a line of refrigerated cases and fixtures to its commercial equipment. Cases, reach-in refrigerators and walk-in coolers will have Frigidaire condensing units, cooling units and valves for both self-contained and remote applications. Six reach-in models will include 20-, 30-, 50- and 60-cu. ft. units with forced air cooling and 20- and 30-cu. ft. models with ice making cooling units. Cases will be available at first in ten styles and sizes. Display cases of the single-duty type will be available in 10- and 12-ft. lengths; double-duty cases in 6-, 8-, 10- and 12-ft. lengths. A 6-ft., full-vision case for dairy and delicatessen use and a double-duty vegetable case 8 ft. long will be made. Walk-in coolers will be available later.

Radio Receivers (1201)

Westinghouse will resume radio production with nine models, one of which is a phonograph combination, and five consoles, four of which are combinations. One table model and all consoles will receive in both the standard broadcast band and the international shortwave band; three consoles will be equipped for FM. Except for a plastic and metal table model, units will have hardwood and veneer cabinets.

One portable combination set features a removable radio receiver. All record players are automatic but can be operated manually if desired, each unit accommodating either 12 10-in. or 10 12-in. records. A new development is the Plenti-Power circuit, said to almost double the output of prewar sets employing the same number of tubes. All models have built-in antennas, but provision will be made for outside connections.

Home Refrigerators (1202)

Hotpoint will have two refrigerator models, both with 7 cu.-ft. capacity. The standard model, the Doric EB7, has 13.4 sq. ft. of shelf area, a newly designed Thriftmaster unit, with increased power. Equipment includes pop-out ice cube trays, high humidity vegetable compartment drawer with glass cover, one sliding shelf and a six-way cold storage compartment. Over-all dimensions are 59 in. high, 31 in. wide and 28½ in. deep. The economy Doric model is similar, but does not have the sliding shelf nor humidity storage drawer.

After a whole year of testing various makes and types of Office Lighting Fixtures

ARMOUR and COMPANY

CHICAGO PACKERS

CHOOSE

Famous MITCHELL U.R.C.* Luminaire

6 TIMES MORE LIGHT THROUGHOUT ENTIRE OFFICE BUILDING

For a full year, Armour's engineers tested many types of lighting fixtures . . . many different makes. MITCHELL U.R.C. Luminaire won . . . *just as it has won in lighting tests all over America.* 1500 units of Mitchell U.R.C. Model No. 2032 were installed . . . surface mounted individually and in continuous rows. All general and private offices throughout entire 6-floor building now enjoy abundant, glareless light. 37 footcandles is average maintained . . . 6 times more light than before! Write for Catalog No. 267 giving full facts and lighting data on Mitchell U.R.C. Model No. 2032.

** This is the original U.R.C. designed by the Utilities Research Commission, and introduced by Mitchell.*

Distributor on Job: Graybar Electric Co., Inc., Chicago Office
Contractor: Fries Walters Co., Chicago

MITCHELL
FOR TOP LIGHTING VALUE

URC

Mitchell Manufacturing Company
2525 CLYBOURN AVENUE, CHICAGO 14, ILLINOIS
West Coast Factory & Sales Office:
1019 N. Madison Ave., Los Angeles 27, Cal.

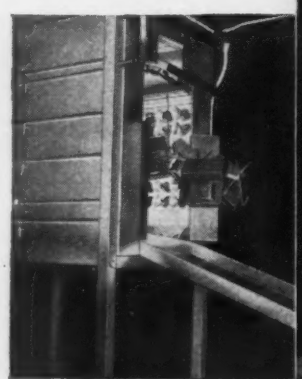
TRUMBULL

RAYMERSION INFRARED OVEN

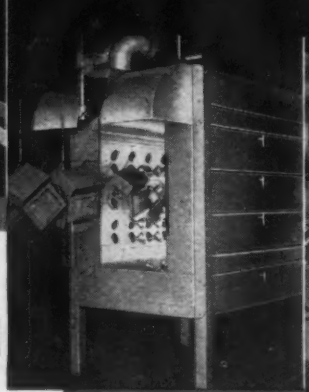
... prefabricated

So Good

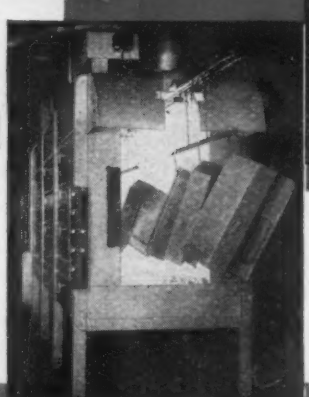
WE USE IT OURSELVES !



Unfinished boxes enter drying oven (after leaving industrial washer) on way to dip tank or spray booth.



After paint dipping, (or spray finish) boxes enter "Raymersion" Baking Oven.



Finished boxes now emerging from Raymersion Oven . . . going to final assembly.

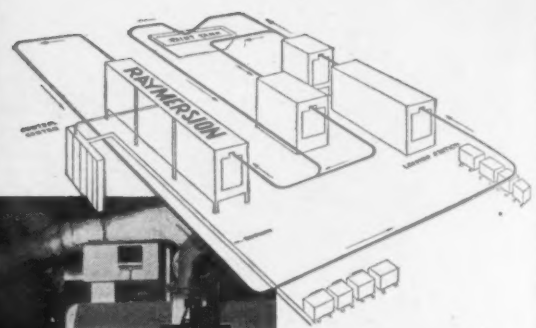
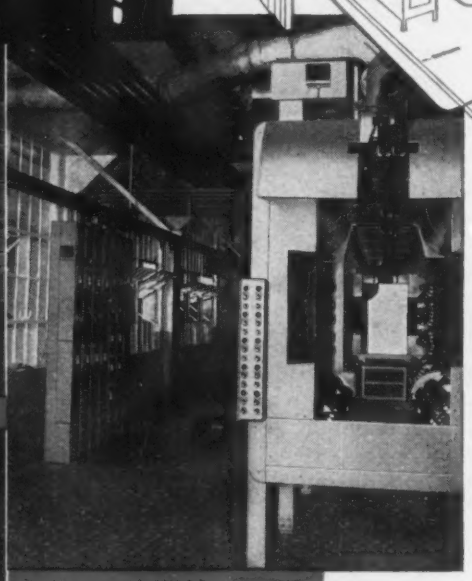


Diagram of Finishing Section showing route of switch boxes through wash, rinse, paint dip (or spray bath) to "Raymersion" Infrared Baking Oven to final assembly.



Showing "Raymersion" Oven, Control Center and selective control system fed by (overhead) Trumbull Flex-A-Power run.

For the finishing section of Trumbull's Switch Box production line we are using our new "Raymersion" prefabricated Infrared Oven . . . just as you can use it in any type of Drying and Baking operation up to 500° F. . . . for work of any size, shape or mass . . . in minimum time, at lowest costs.

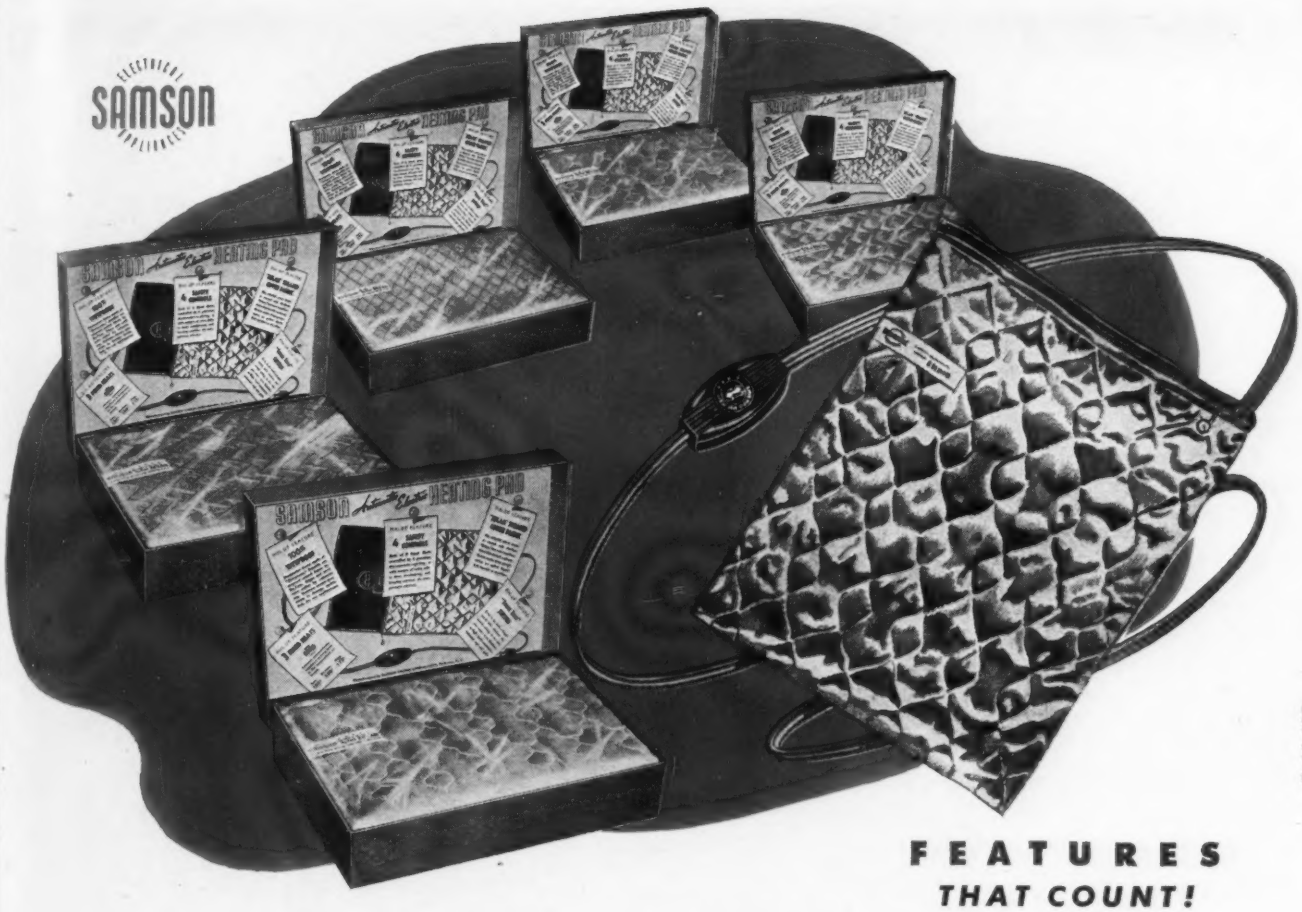
All oven components come to you ready for easy assembly, with associated Distribution and Circuit Control Apparatus . . . if required, all equipment for a 100% complete installation. Bulletin 500 on request.

THE TRUMBULL ELECTRIC MANUFACTURING CO.

PLAINVILLE, CONNECTICUT

OTHER FACTORIES AT

NORWOOD (CINN.) OHIO— LOS ANGELES—SAN FRANCISCO—SEATTLE



MAKE THIS "PACKAGED-TO-SELL" LINE THE HEART OF YOUR *Therapeutic Department*

SAMSON Heating Pads for 1946 offer you not just another store item, but the nucleus of a fast-moving, money-making therapeutic *department!* You get a *complete line* of pads, in a wide range of styles, colors and prices. You get each pad cellophane wrapped and smartly packed in a colorful, *compact* display box, the cover of which pictures and describes the features that make SAMSON Heating Pads the easiest-selling merchandise of their kind. You get a "profit-package" that, open or closed, is a silent salesman telling a story that prompts people to buy.

Why not decide *now* to make SAMSON'S "packaged-to-sell" line of Heating Pads the heart of *your* therapeutic department!

FEATURES *THAT COUNT!*

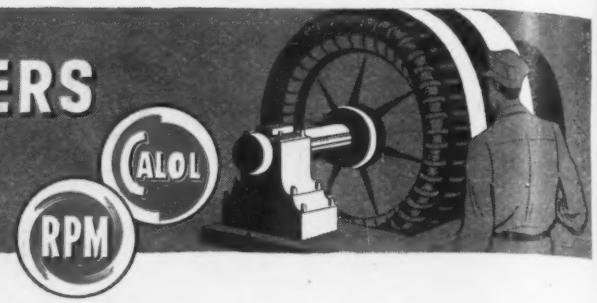
• Regardless of its price, every SAMSON Heating Pad has the same high quality features that assure customer satisfaction. Patented SAFE-T Circuit, with 3 Fixed Heats, each controlled by precision thermostats; permanently sealed 100% wetproof cover of Du Pont Fairprene; Zelan-treated water repellent and stain resistant extra covers; cushion-comfort padding; strain-relief switch with the exclusive "Touch Tells" indicator for night use; 8-foot cord.

See the SAMSON display at the HOUSEWARES EXHIBIT, Room 638, Palmer House Chicago, Dec. 30—Jan. 4, inc.

SAMSON UNITED CORPORATION, ROCHESTER 10, N. Y.

Samson United of Canada, Limited, Toronto

STANDARD ENGINEERS NOTEBOOK



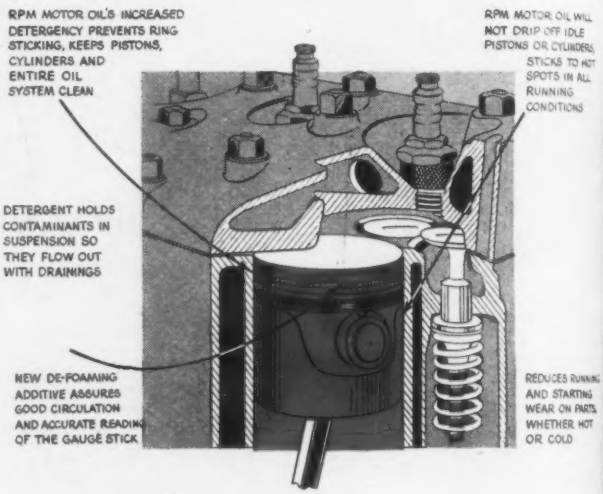
Improved RPM Motor Oil compounding reduces overhauls

Because of the lessening of military requirements for special ingredients used in heavy-duty lubricating oils, more compounding is now used in the manufacture of RPM Compounded Motor Oil. Operators using RPM Motor Oil will find engines running much cleaner and a marked reduction in wear on parts.

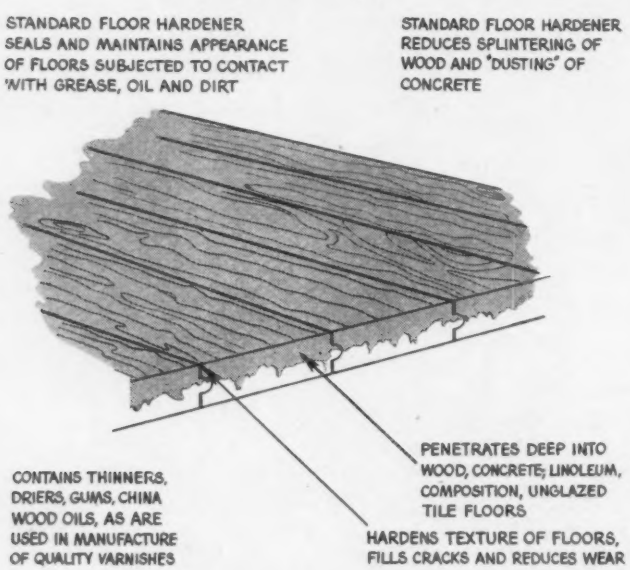
More detergent in RPM Motor Oil assures loosening of any gum-carbon deposits around rings, thus preventing sluggish action of rings, sticking and blow-by. Its washing action keeps cylinders, pistons and oil systems cleaner. It keeps contaminants dispersed in the oil until drained.

A new de-foaming compound has been added to RPM Motor Oil assuring full-flow oil circulation.

One hundred percent paraffin base RPM Compounded Motor Oil is improved in all of its old qualities including special affinity for metal whether hot or cold, resistance to oxidation and sludging, and prevention of corrosion on all engine parts.


RPM MOTOR OIL'S INCREASED DETERGENCY PREVENTS RING STICKING, KEEPS PISTONS, CYLINDERS AND ENTIRE OIL SYSTEM CLEAN
RPM MOTOR OIL WILL NOT DRIP OFF IDLE PISTONS OR CYLINDERS, STICKS TO HOT SPOTS IN ALL RUNNING CONDITIONS
DETERGENT HOLDS CONTAMINANTS IN SUSPENSION SO THEY FLOW OUT WITH DRAININGS
NEW DE-FOAMING ADDITIVE ASSURES GOOD CIRCULATION AND ACCURATE READING OF THE GAUGE STICK
REDUCES RUNNING AND STARTING WEAR ON PARTS WHETHER HOT OR COLD

Hardener lengthens life of plant floors


STANDARD FLOOR HARDENER SEALS AND MAINTAINS APPEARANCE OF FLOORS SUBJECTED TO CONTACT WITH GREASE, OIL AND DIRT
STANDARD FLOOR HARDENER REDUCES SPLINTERING OF WOOD AND 'DUSTING' OF CONCRETE
CONTAINS THINNERS, DRIERS, GUMS, CHINA WOOD OILS, AS ARE USED IN MANUFACTURE OF QUALITY VARNISHES
PENETRATES DEEP INTO WOOD, CONCRETE, LINOLEUM, COMPOSITION, UNGLAZED TILE FLOORS
HARDENS TEXTURE OF FLOORS, FILLS CRACKS AND REDUCES WEAR

Where maintenance of floors is a problem because of excessive use, wear from grit, contact with grease, oil, fruit juices or discoloration, Standard Floor Hardener is recommended.

Made from special petroleum oils, wood oils, gums and thinners, most of which are used in making a quality varnish, Standard Floor Hardener penetrates deeply, hardens wood, concrete, linoleum, composition flooring and unglazed tile. It should not be used on any rubber or asphaltic product.

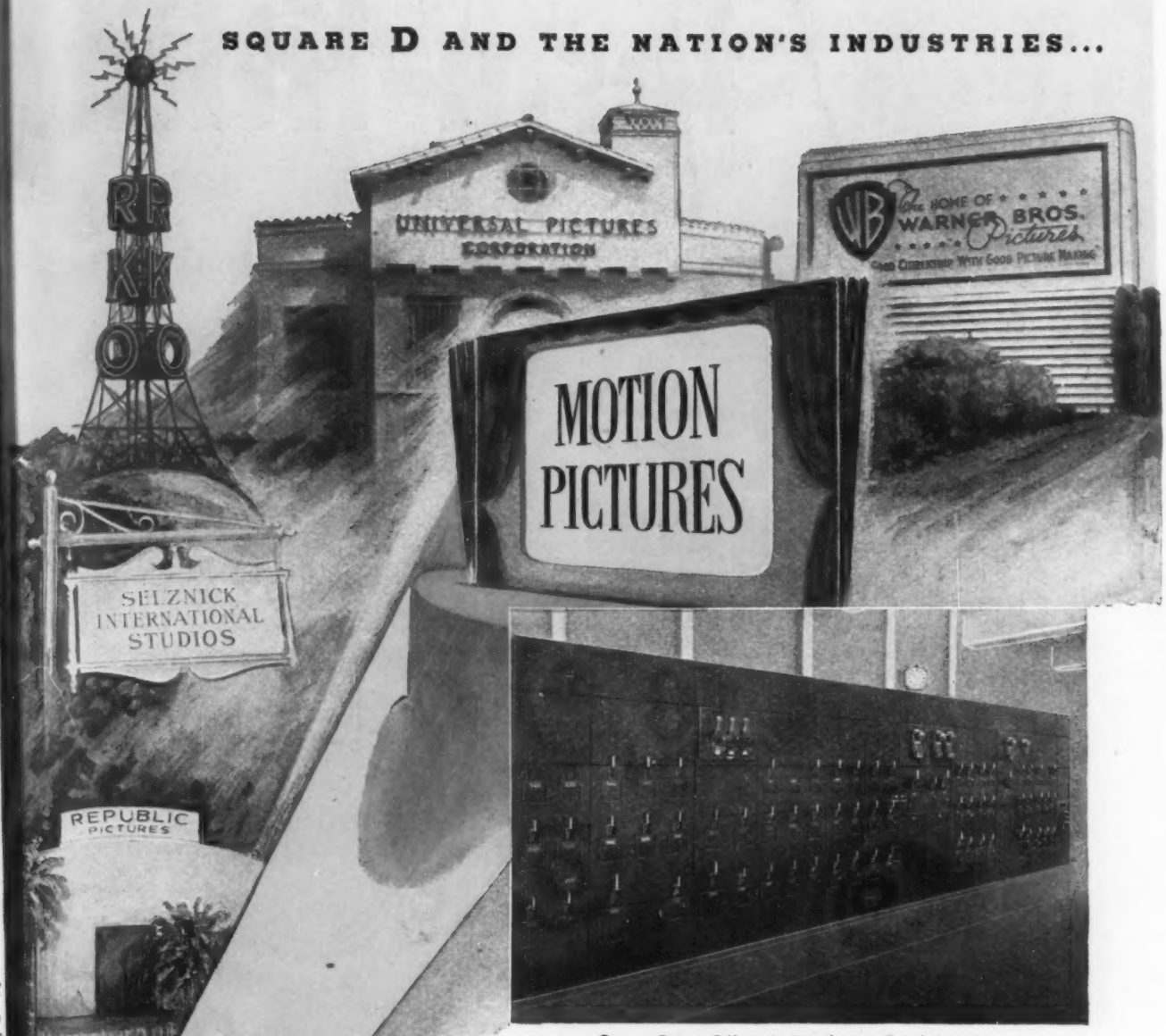
Standard Floor Hardener provides a hard, non-slippery surface that prevents absorption of dirt, grease, etc., and makes cleaning much easier and faster. It stops excessive splintering and chipping of wood and "dusting" of concrete.

Because a gallon of Standard Floor Hardener covers up to 600 square feet, it is economical. It may be thinned as much as 25 percent with Standard Compounded Paint Thinner.

Standard Fuel and Lubricant Engineers are always at your service. They'll gladly give you expert help — make your maintenance job easier. Call your local Standard Representative or write Standard of California, 225 Bush St., San Francisco 20, California.

FOR EVERY JOB A **STANDARD OF CALIFORNIA** TEST-PROVED PRODUCT

SQUARE D AND THE NATION'S INDUSTRIES...



Square D type P.K. Main Distribution Switch Board in operation at major Hollywood Motion Picture Studio.

● To motion picture players, the winning of an "Oscar" represents acting perfection. But behind this coveted award, are many far reaching factors which make that degree of perfection possible. Not the least in importance is Square D Electrical Equipment, designed and built for uninterrupted electrical service from camera to screen.

In order to achieve SUSTAINED ELECTRICAL SATISFACTION, many motion picture studios use Square D Control Equipment. Technical and sound engineers know that the success of Square D is built upon four basic principles... PRECISION WORKMANSHIP, CORRECT DESIGN, SOUND ENGINEERING and TROUBLE-FREE OPERATION.

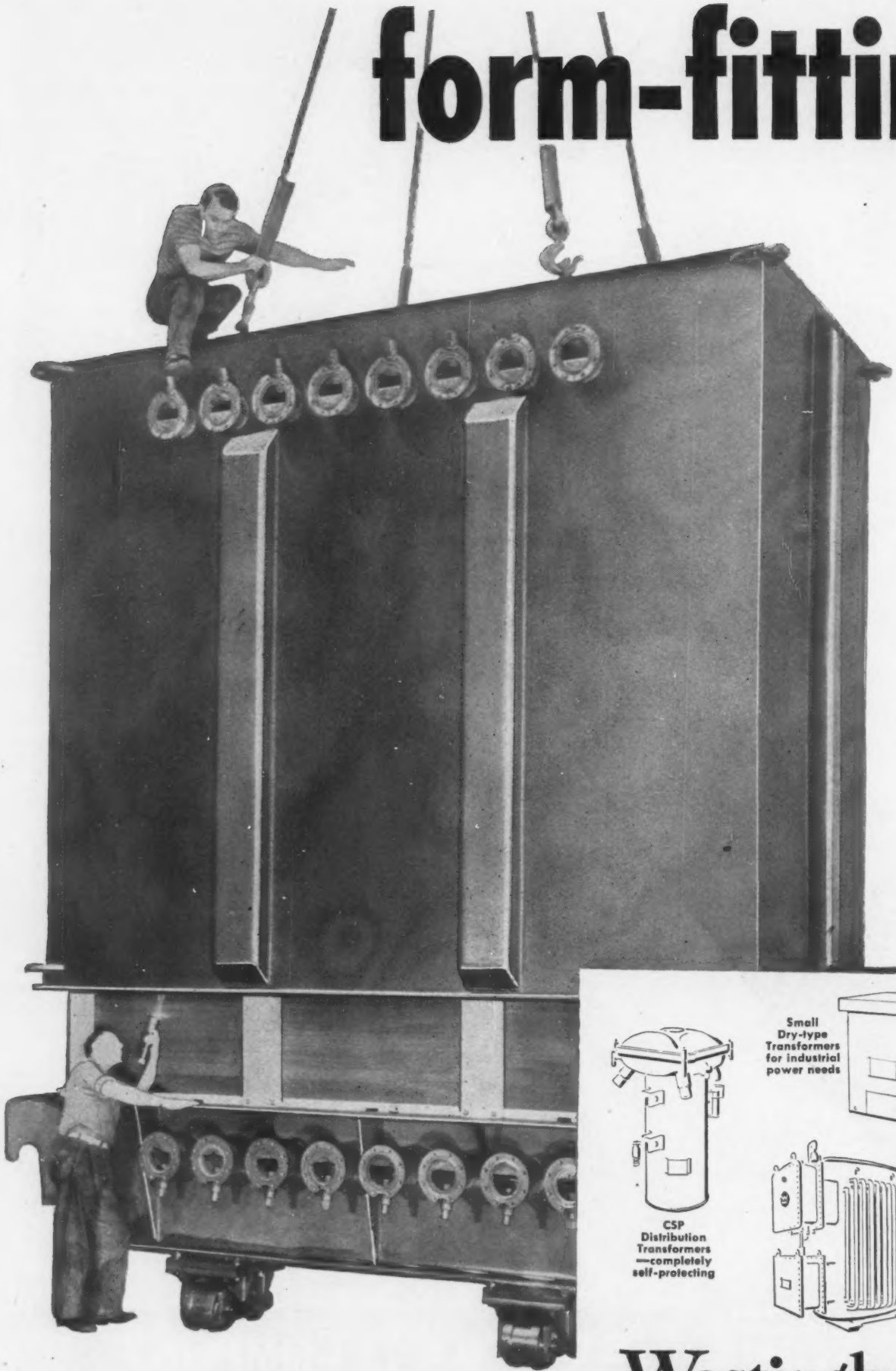
To Industry, the nation over, Square D is the working symbol for electrical control perfection.

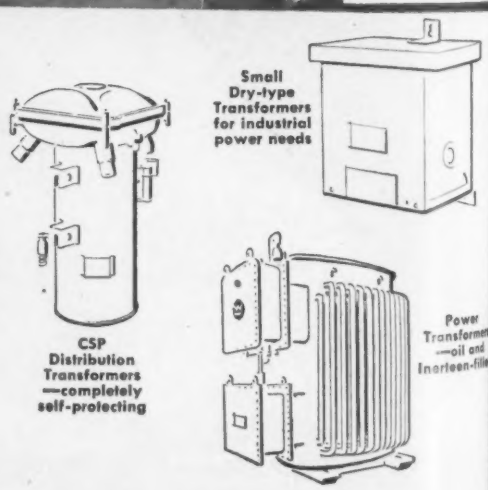
A call to your local Square D Field Engineer or Distributor, will bring an immediate solution to your electrical control problems.

SQUARE D COMPANY

ANGELES 21 SAN FRANCISCO 3 • SEATTLE 1 • DENVER 4 • DETROIT 11 • MILWAUKEE 2

form-fitting





Small Dry-type Transformers for industrial power needs

CSP Distribution Transformers —completely self-protecting

Power Transformers —oil and Inerteen-filled

Westinghouse

PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE

dress FOR TRANSFORMERS THAT WORK IN CLOSE QUARTERS

. . . ANOTHER WESTINGHOUSE TRANSFORMER *Achievement*

Building a 37,500-kva transformer that could be lowered through the hatch of a ship called for a new approach to transformer tank design. This was the problem given Westinghouse engineers: smallest possible dimensions, with weight held to the minimum.

Westinghouse "Form-Fit" tank construction provided the solution. A shell-form transformer was supplied which weighs 19% less than the standard forced-oil-cooled unit, requires 33⅓% less oil, and 35% less floor space.

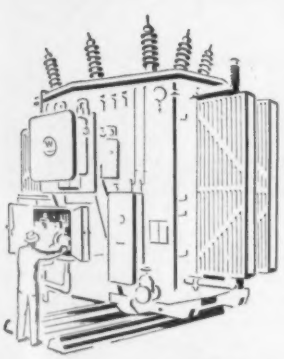
"Form-Fit" construction also results in many advantages for regular central station applications. For example, completely assembled transformers—up to 100,000 kva, 3-phase, 230 kv ratings—can be shipped in their own tanks. This eliminates the need for split tanks or special shipping tanks—saving installation time and expense.

Headroom and crane capacity necessary for installing and periodic untanking are reduced with "Form-Fit" transformers—an advantage in any location.

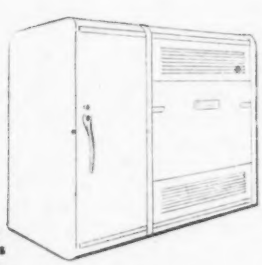
Westinghouse experience in designing and building transformers of every type and size, starting with the first commercial units built, brings to Westinghouse users many exclusive advantages formerly considered "specials". So, whatever *your* needs may be, you'll find it pays to consult Westinghouse. See your representative or write Westinghouse Electric Corporation, P.O. Box 868, Pittsburgh 30, Pa. J-70456

THE RIGHT INSTRUMENT TRANSFORMER . . . WHATEVER THE JOB

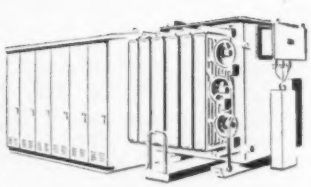
It's probable that you will save time and money by consulting Westinghouse first for instrument transformers. In this complete Westinghouse line there is an instrument transformer for every metering and relaying application, indoors and out. Write for latest literature on your requirements.



Power Regulators for tie-line power control



Type ASL Air-Cooled Transformers and Power Centers for indoor service



Unit Substations —time and space-saving "Packaged Power" units

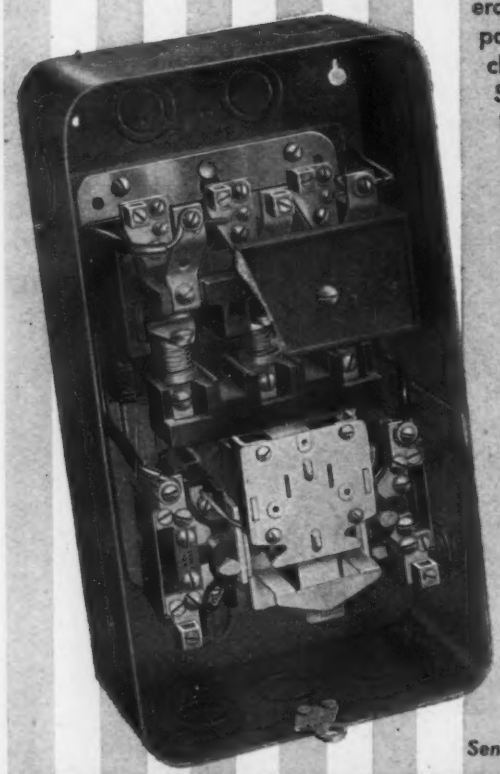
WESTINGHOUSE

first name in transformer equipment

Federal's Noark Magnetic Starter
Is completely different and plenty smarter
Equipped with action that's ball-bearing
For safe control and longer wearing

Federal
NOARK

Magnetic Motor Starters



There's only one moving part in Federal Noark Controls . . . and that part rolls on ball bearings—an exclusive Federal feature! Result? Smooth, faster making and breaking of contact, accurate action . . . less friction . . . longer life. Here are more reasons for specifying Federal starters:

- Double break pure silver contacts held by a single screw for ready replacement.
- Heavy arc barriers located for strength, flashover resistance, high arc rupturing.
- Molded parts have asbestos base with non-carbonizing inorganic binder.
- Coils readily changeable—just remove retainer spring, loosen yoke, take out magnet.
- Overload relays—*combination hand and automatic reset.* Bimetalic type. Originated by Federal.
- Heaters frontmounted, accessible; trip ampere stamped on units.

Send for your copy of the FEDERALOG.

FEDERAL ELECTRIC PRODUCTS COMPANY, INC.
EXECUTIVE OFFICES: 50 PARIS ST., NEWARK 5, N. J. · PLANTS: HARTFORD, CONN. · NEWARK, N. J.

Kitchen Ventilators (1203)

Ilg has kitchen ventilators in production. Built-in models are available in three sizes: Ilgvent for small, Ilgette for medium and Ilgair for large kitchens. An Ilgette automatic model is equipped for electrical operation, the others being "pull chain" manual operation units. Portable models have adjustable panels to fit any sliding sash window frame. Two sizes are available in "Package type" for permanent installation in window pane.

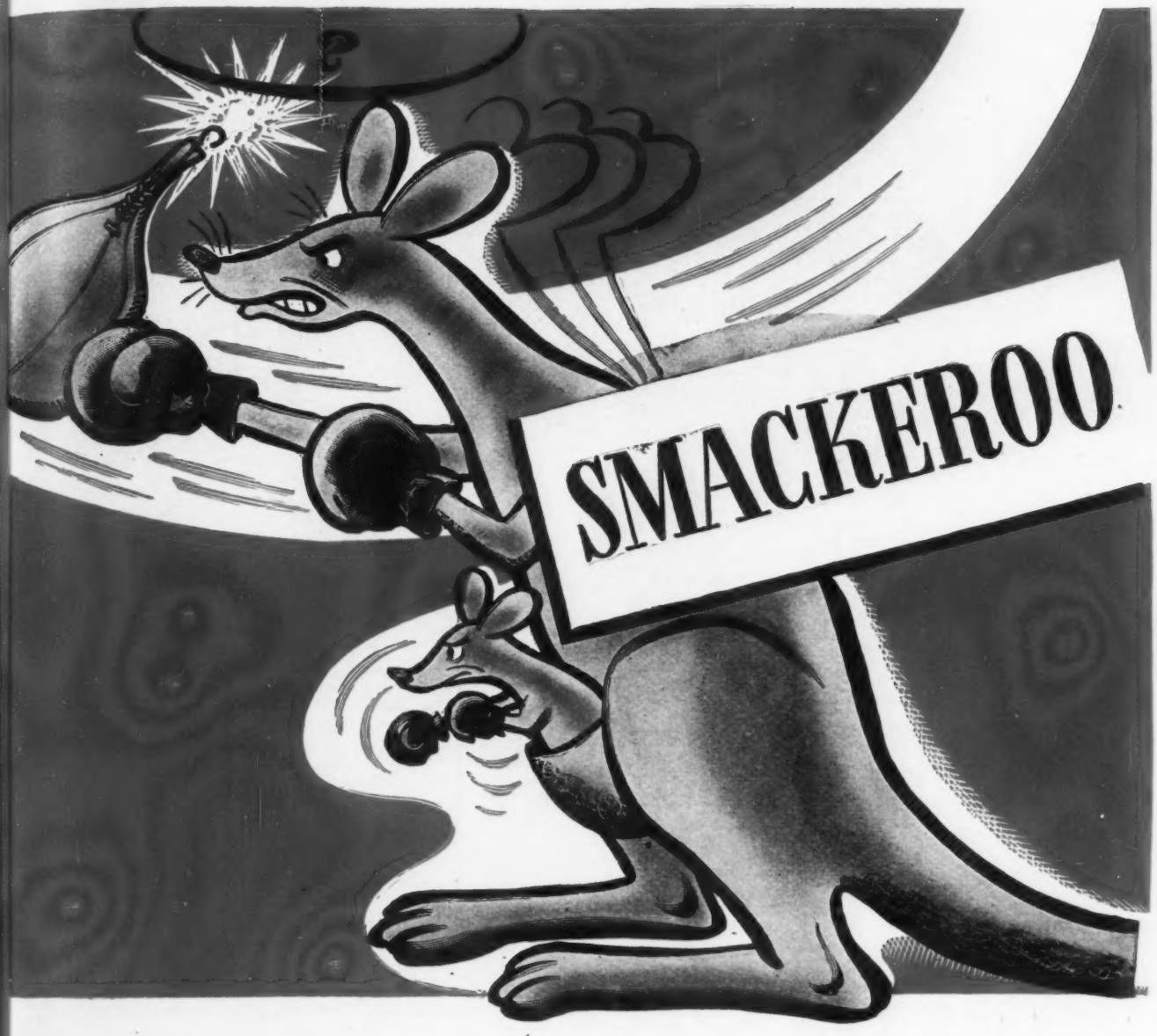
Dishwasher (1204)

The new Hotpoint dishwasher is a fully automatic unit, which sprays, rinses, washes and dries at touch of one button. Electrical controls send the mechanism through eight cycles. A water conditioner which replaces soap is automatically injected from a small trap in the left corner of the door.

Refrigerator Line (1205)

Kelvinator has announced three 7-ft. refrigerator models and one 9-ft. model. The new Moist Master 9-ft. refrigerator makes provision for freezing and storing frozen foods, for foods with high moisture content and for general storage. It has a freezer capacity of approximately 9 lb. of ice cubes and more than 35 lb. of packaged frozen foods.

The CS-7 model has 12.2 sq. ft. of shelf area with freezer capacity of 9 lb. of ice cubes and 20 lb. of packaged frozen foods. The C-7 has in addition a vegetable crisper, sliding meat chest, a five-way shelf and a 1¼-bushel vegetable bin; the DC-7 has double crispers, 13.1 sq. ft. of shelf space and 9 lb. of freezer capacity for cubes and more than 30 lb. for packaged foods.



That's the way a 27½ pound hammer, falling free, hits in the "impact test" given all U. S. Royal Cords and Cables. As many as two thousand blows in rapid succession without the cable failing!

A whole series of such tests is made on U. S. Royal Cables—heat, cold, compression, stretch—tests that prove the stamina to take rough treatment in the field.

Yes sir, these Royal Cables have everything you need for long, trouble-free service...you can specify them with complete confidence.

THE NEW U. S. ROYAL *Safety Tested*

ELECTRICAL CORDS AND CABLES

Listen to "Science Looks Forward"—new series of talks by the great scientists of America—on the Philharmonic-Symphony Program. CBS network, Sunday afternoon, 3:00 to 4:30 E. S. T.

UNITED STATES RUBBER COMPANY

SERVING THROUGH SCIENCE *WITH ELECTRICAL WIRES AND CABLES*

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In Canada: Dominion Rubber Co., Ltd.

GRAYBAR CAN SPEED YOUR COME-BACK

Lines down! Replacement items urgently needed. Can Graybar supply them? Yes — because we've had years of experience in meeting emergency demands, and because we maintain stocks of essential pole-line supplies at more than eighty warehouses — strategically located throughout the nation. Graybar men are always on call to speed these supplies to wherever you need them — day or night — to meet any emergency.

Should use of alternates for any items be necessary, Graybar's Outside Construction Specialists have the technical knowledge to suggest satisfactory ones. Should the emergency isolate any Graybar warehouse, another can supply what's needed.

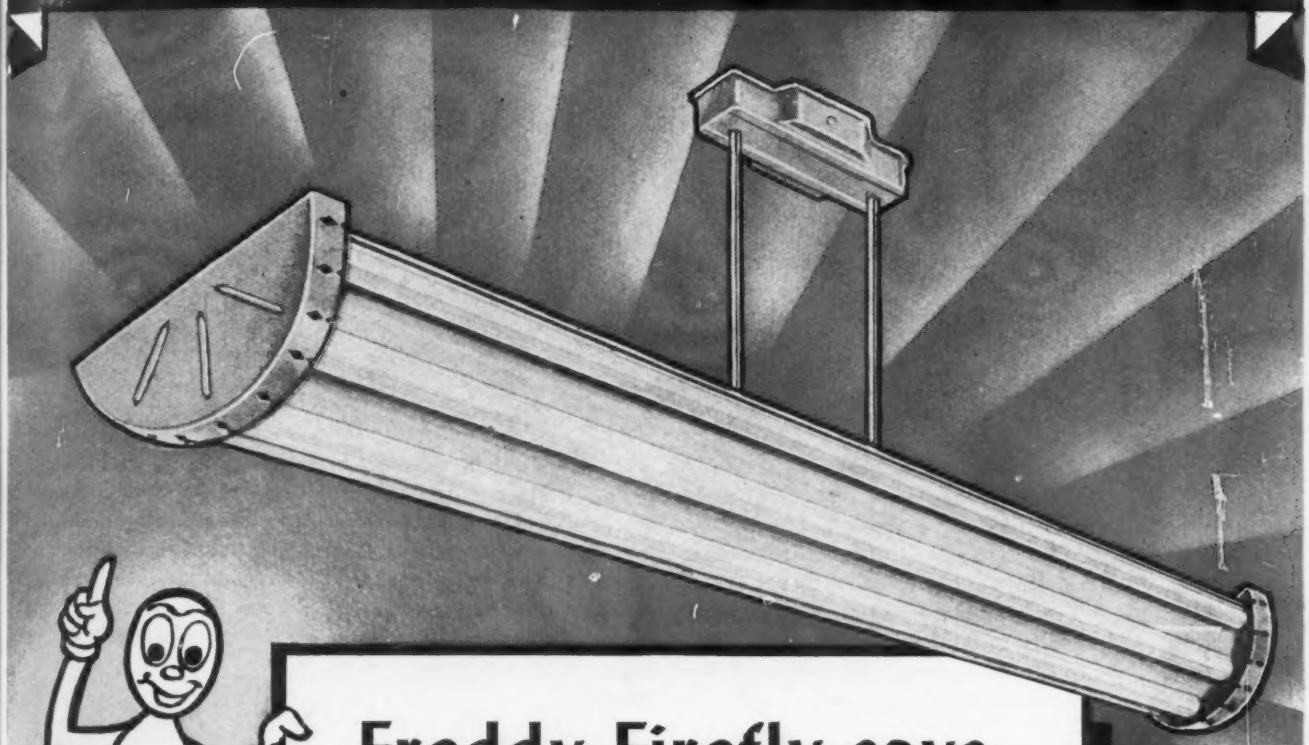
The same resources that enable Graybar to render outstanding emergency service are available to you *always* — offering you local delivery of first-quality line wire, hardware, poles, crossarms, insulators, pins, and tools. You'll find it pays to give the nearby Graybar man the responsibility of meeting *all* your pole-line requirements. *Graybar Electric Co., Graybar Bldg., New York 17, N.Y.*

4594

Via GraybaR
...First Source of Pole-Line Supplies

IN OVER 80 PRINCIPAL CITIES

KAHN MANUFACTURING, INC.



Freddy Firefly says:

Meet our West Coast representatives!

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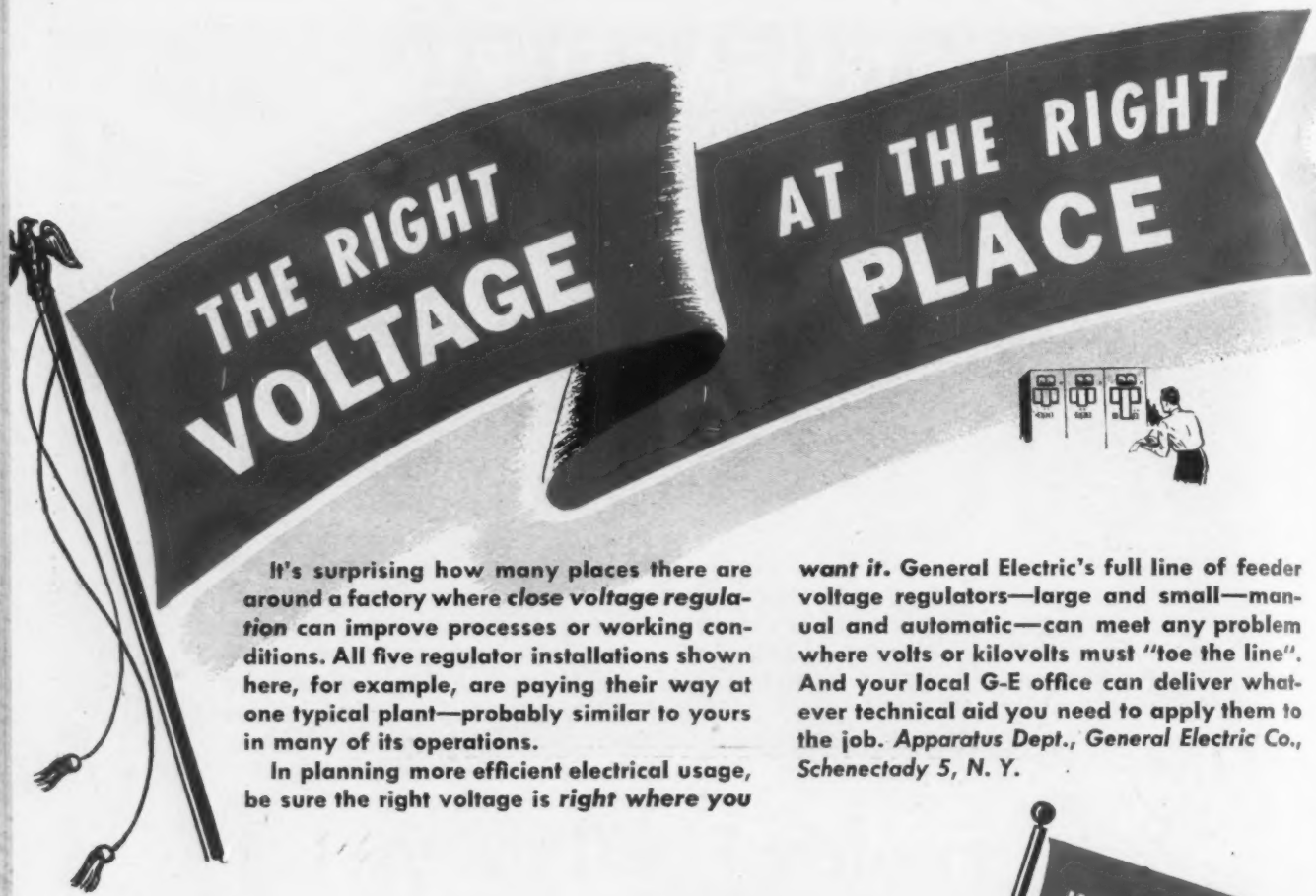
Formerly Fluorescent FIXTURES, INC.
Manufacturers of the Famous Firefly Fixtures



It's surprising how many places there are around a factory where *close voltage regulation* can improve processes or working conditions. All five regulator installations shown here, for example, are paying their way at one typical plant—probably similar to yours in many of its operations.

In planning more efficient electrical usage, be sure the right voltage is *right where you want it*. General Electric's full line of feeder voltage regulators—large and small—manual and automatic—can meet any problem where volts or kilovolts must "toe the line". And your local G-E office can deliver whatever technical aid you need to apply them to the job. *Apparatus Dept., General Electric Co., Schenectady 5, N. Y.*

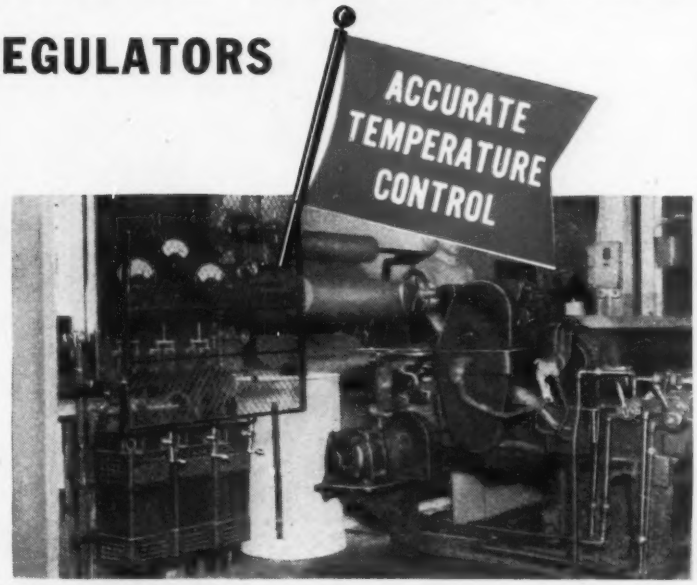
1 These dry-type induction voltage regulators are used to control temperature of a wire-annealing operation. Twelve strands are processed simultaneously, each regulator acting to control the current-flow through series-connected sections of two conductors. These hand-operated regulators make it easy to adjust for different conductor sizes and other changes in operating conditions.

2 Smooth, stepless voltage control for 100,000-volt testing equipment is provided by this 5-kva dry-type induction voltage regulator. Connected in the primary (low-voltage) side of the step-up transformer, this regulator affords 100 per cent raise-and-lower regulation, so that output test voltage can be varied from 0 to 100 kv, simply by turning the crank.

...PAYS OFF 5 WAYS AT A SINGLE PLANT

USING G-E VOLTAGE REGULATORS

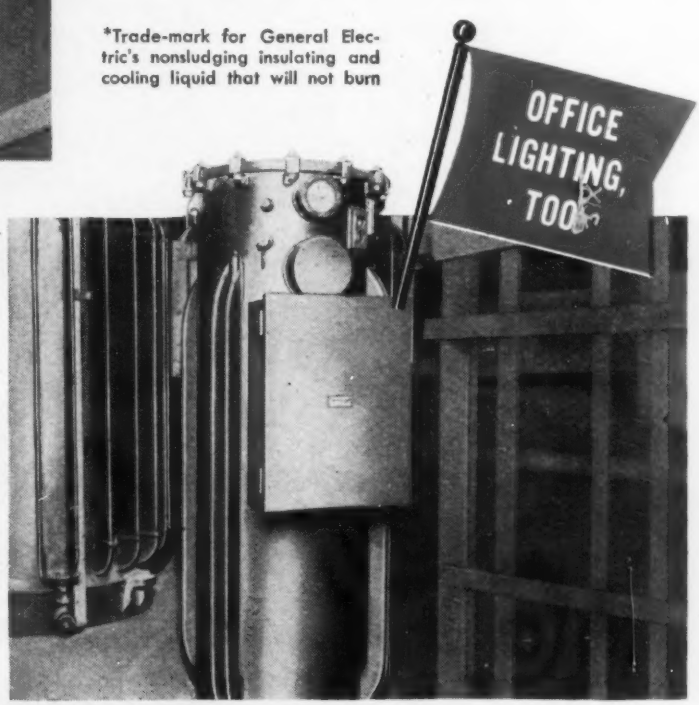
3 Electric heating circuits on a hot-rolling press used to fabricate laminated plastic forms are maintained at the required temperature with induction voltage regulators. Circuits for two electrically heated rollers and one hot plate are separately controlled by the hand-operated regulators, giving close control of processing.



4 Automatic voltage regulation by means of this dry-type induction regulator has "paid off" in a more uniform level of illumination. The full visual value of every kw-hr is obtained with fewer lamp burn-outs from overvoltage. Production space is saved by locating the regulator on a platform along with the Pyranol* transformer which serves the lighting circuits.

*Trade-mark for General Electric's nonsludging insulating and cooling liquid that will not burn

5 This 48-kva Pyranol induction voltage regulator, installed in a basement substation, automatically maintains the proper voltage for lighting circuits in the plant office building. A Pyranol regulator was chosen for its safety in this confined indoor location.



For complete information on any of General Electric's voltage regulation equipment, write for the following publications:

Oil-immersed Induction Voltage Regulators—Type IRS
GEA-2018 (24 kva and smaller)
GEA-2985 (36 kva and larger)
Pyranol Induction Voltage Regulators—Type IRS, GEA-3443
Dry-type Induction Voltage Regulators—Type AIRS, GEA-3057
Inductrols (Small Dry-type Induction Voltage Regulators) GEP-238
Automatic Voltage Stabilizers GEA-3634
Variable-voltage Autotransformers GEA-3635

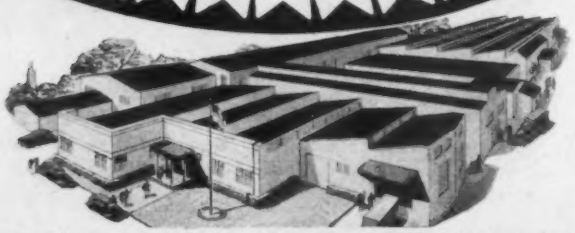
GENERAL ELECTRIC

404-38-5400

PLASCOLIER

A new shielded luminaire that is now in production by Smoot-Holman. Extremely efficient, combining minimum surface brightness, maximum diffusion, low absorption. Lightweight plastic diffuser is safe to handle, no breakage hazards. Write for Catalog Supplement No. 22.

SMOOT-HOLMAN COMPANY
SMOOT-HOLMAN
INGLEWOOD, CALIFORNIA
MADE IN U.S.A.



Offices in Principal Western Cities—Branch and Warehouse in San Francisco

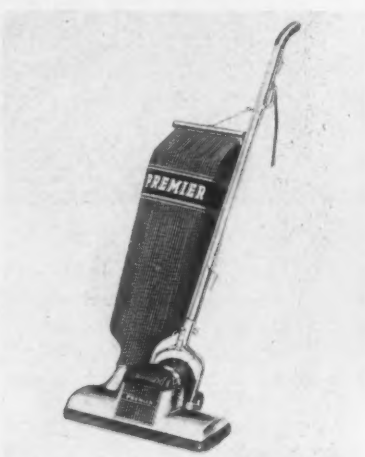
Range Line (1206)

Kelvinator's range line includes three models, the Automatic Cook, top-of-the-line model, and two lower priced models. The deluxe model, pictured, is equipped with an automatic timer which controls oven, top of range and deep well cooking operations. An electric clock, cooking timer, selector switch, minute timer and twin appliance outlets are set in a panel under a fluorescent top light.

A thermostatically controlled warmer drawer can be used also as a utility drawer to supplement two utility drawers at the bottom of unit. A two-unit broiler oven bastes automatically and has an automatic flood light recessed in the back.

All three ranges have a 400-sq. in. working surface. Surface units are rod type, one a seven-heat, 2,100-watt unit, two seven-heat, 1,250-watt units. Switches are reversible, seven-position type, individually lighted. The built-in seven-heat Scotch Kettle unit has 6-qt. capacity.

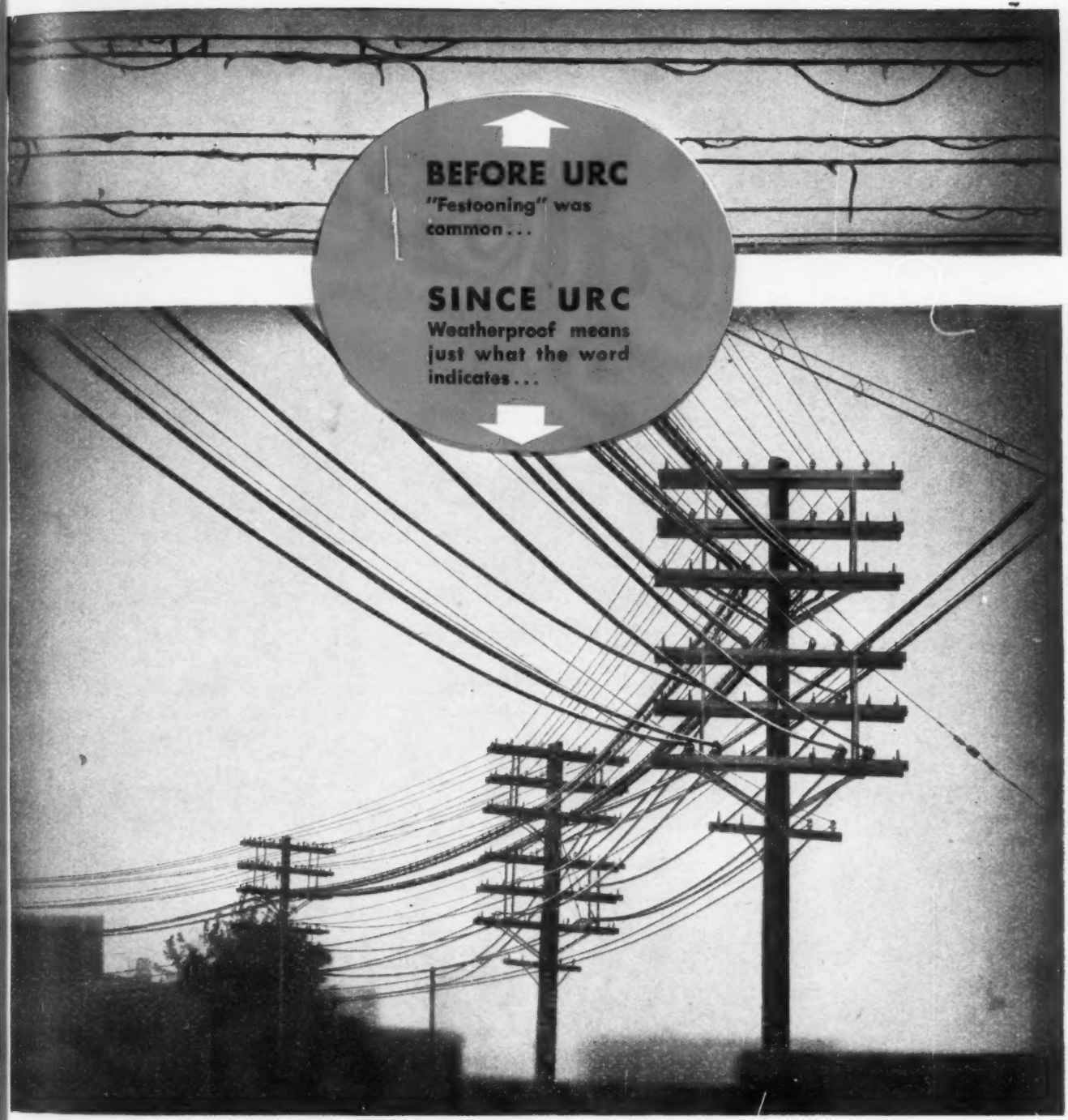
Vacuum Cleaner (1207)



Premier's model 21 vacuum cleaner, now in production, features the company's Duo-Matic nozzle, which requires no adjustment except for extra thick rugs, where a turn of the adjuster is needed. This cleaner has a two-speed ball-bearing motor.

New F Lamp (1208)

A fluorescent lamp known as 4,500 degree white and described as about midway in color quality and light output between the present standard white F lamp and the daylight lamp, has been announced by Westinghouse. The new lamp will be offered initially in 40- and 100-watt sizes only. Light output is said to be somewhat greater than that of regular daylight lamps and the color of light to be warmer, making it more suitable for general indoor lighting service.



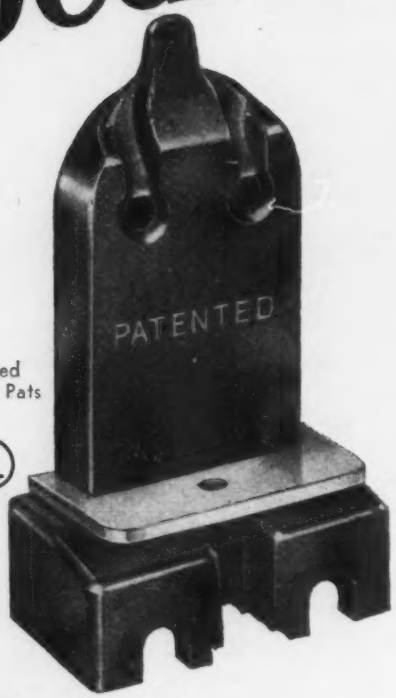
Weatherproof LASTS!...and LASTS!!...and LASTS...!!!

FOR CONTINUITY OF SERVICE ...ANACONDA TRIPLE BRAID and DURALINE URC

Thorough research—strict manufacturing and testing procedure—these are reasons for the long life of Anaconda URC. No coming apart—no festooning. Be *sure* of maintenance-free service—*specify Anaconda URC Weatherproof.*

LOOK TO **Anaconda** FOR WEATHERPROOF, THAT LASTS!

Unbeatables



Patented
Other Pats
Pend.

Pat. Nos.
2200443
2228210

Lloyd Flex-Loc lampholder Automatic Starter

FLEX-LOC Lamp Holder

FLEXIBLE — Automatic — self-adjusting to variations in lengths of lamps or spacing of mounting holes. Engineered to fit all standard spacings.

AUTOMATIC LOCK is positive. No need for extra locking devices. Lamp cannot fall out. Contacts cannot loosen.

EASY insertion and removal. No twisting. No turning. No fussing to seat lamp in holder. FLEX-LOC does the work automatically. As lamp pins slide up to terminal holes, holder is flexed outward. As pins enter holes, holder snaps inward, internal spring returning to normal.

PERFECT ELECTRICAL CONTACT — Newly designed, patented terminals grip BOTH sides of lamp pins . . . make sure and positive contact.

Listed and Approved by Underwriters' Laboratories Inc.

Automatic Starter

Positively cuts out deactivated, flickering, blinking lamps.

When trouble is detected the starter automatically cuts off current to the ballast and lamp.

Gives long life to ballast because defective lamp is locked out. Prevents overheating.

When Lloyd AUTOMATIC locks out defective lamp—turn off the current—remove defective lamp—put in a new lamp. Allow at least one minute to make above changes. Turn on current. The starter automatically lights the new lamp.

The life of the AUTOMATIC starter is many times greater than that of the average lamp.

It saves maintenance costs and power consumption, protects and insures longer life to ballast and lamp.

Certified by Electrical Testing Lab., Spec. 6

Lloyd Policy Insures Quality

LLOYD PRODUCTS CO.

Providence 5, R. I.

Branch Offices and Warehouses in 27 Leading Cities

VARNISHED FIBERGLAS-AND-FIBER

DUPLEXED VARNISHED FIBERGLAS

SPECIAL THIN SLOT INSULATIONS

3 IMPROVED SLOT INSULATIONS BY IRVINGTON

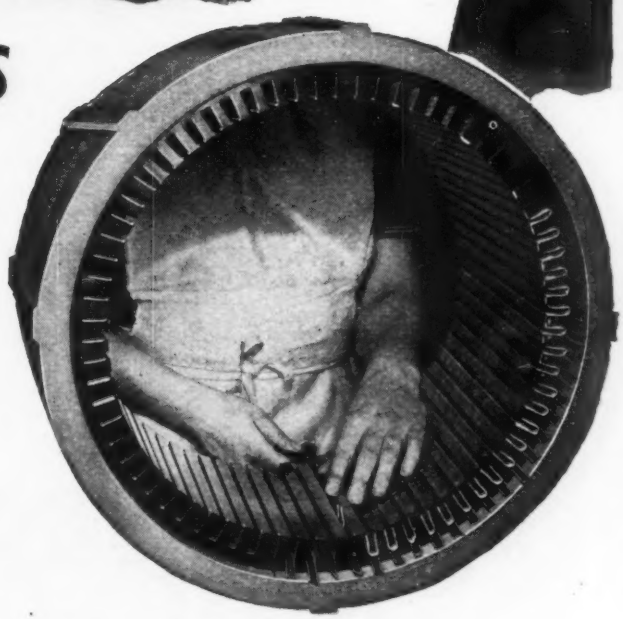
Irvington again sets the pace with three improved insulations:

Varnished Fiberglas-and-Fiber, that combines the heat and moisture resistance and high mechanical strength of flexible Fiberglas with the high insulating qualities of Irvington formulated varnish.

Duplexed Varnished Fiberglas, that furnishes added protection against high temperatures and dampness with two layers of varnished Fiberglas that are flexibly bonded together, providing increased dielectric and mechanical strength and improved cushioning effect.

Special Thin Slot Insulations, consisting of varnished Fiberglas, rayon, nylon or cambric, duplexed to rag paper, in extremely thin combinations which provide high dielectric insulations for narrow and shallow slots wherever space is limited.

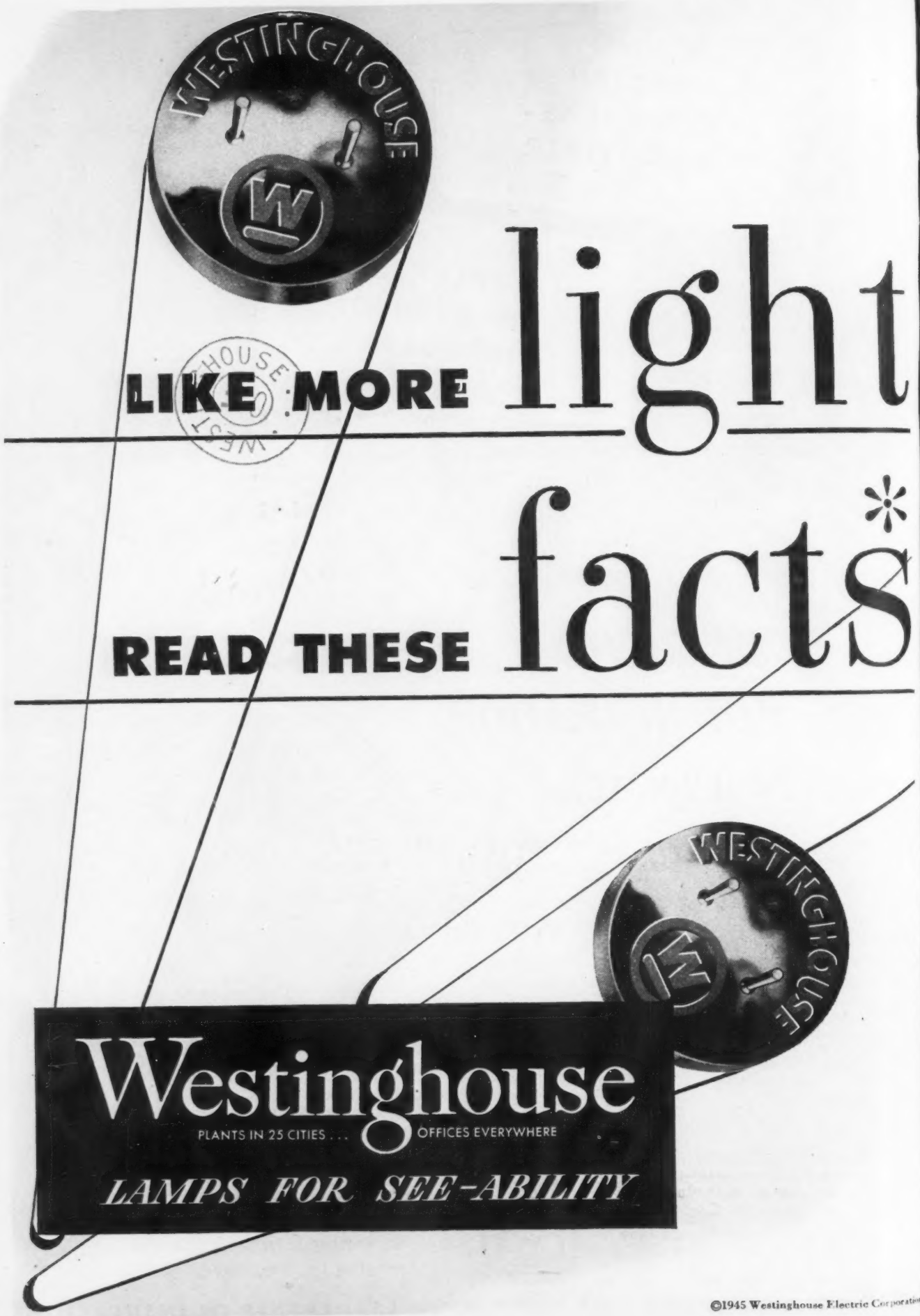
With these three additions to its broad line, Irvington further increases its leadership in the production of slot insulations to meet all operating conditions and requirements. Complete cooperation in fulfilling your needs is freely offered. Write Department 44.



Other Irvington products include . . . insulating varnish, plastic tubing and tape, varnished tubing, varnished fabrics, varnished Fiberglas, wire markers, Cardolite Compounds.

IRVINGTON
VARNISH & INSULATOR CO.
Irvington 11, New Jersey, U. S. A.

LOOK TO IRVINGTON FOR CONTINUED LEADERSHIP IN INSULATION


WESTINGHOUSE
W
LIKE MORE light
READ THESE facts*
WESTINGHOUSE
W
Westinghouse
PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE
LAMPS FOR SEE-ABILITY
©1945 Westinghouse Electric Corporation

ON LAMPS?

ON FLUORESCENTS

✻ Lamp buyers by the thousands have learned that they can look to Westinghouse for thorough-going lamp satisfaction.

✻ These buyers are hard-headed businessmen — satisfied Westinghouse users in stores, offices, plants and other buildings all over the U. S.

✻ In order to keep these thousands upon thousands of people pleased with Westinghouse Lamps, Westinghouse maintains an elaborate system of testing, checking, inspecting—all the way from raw materials to finished, packaged lamps. This is costly —but pays off in customer satisfaction.

✻ Westinghouse always has maintained year-in, year-out, never-stop research.

✻ Continual improvements in manufacturing technique mean continual improvements in the lamps themselves.

✻ For these reasons, if you want to get the most out of handling lamps, it pays to push Westinghouse Lamps. Westinghouse Electric Corp., Lamp Division, Bloomfield, N. J.

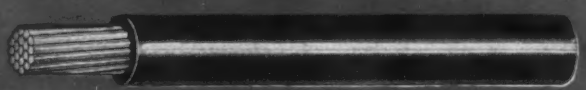
WESTINGHOUSE PRESENTS *John Charles Thomas, Sunday, 2:30 P. M., E. W. T., N. B. C.*
Tune in Ted Malone, Monday through Friday, 11:45 A. M., E. W. T., Blue Network

CRESCENT

Makes A Complete Line Of

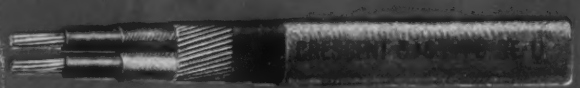
ELECTRICAL WIRES & CABLES

CRESCORD . *Jacketed Portable Cord*



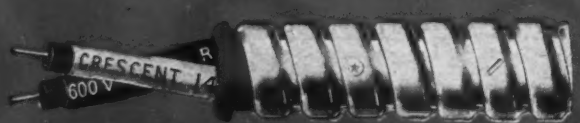
SYNTHOL *Building Wire - Types T & TW*

Rubber Covered Building Wire and Cable



Service Cable - Types SE-U; SE-A; SD

CRESFLEX *Non-Metallic Sheathed Cable*



A B C *Armored Cable*

AND AMONG OTHER TYPES THE FOLLOWING:

Bare Copper Wire & Cable
Bell Wire
Brewery Cord
Control Cables
Fire Alarm Cable
Fixture Wires
Flexible Cords
Flexible Steel Conduit
Heater Cord
PERMACORD
Power Cables
Shipboard Cable
Signal Cable
Slow-burning Wire & Cable
Switchboard Wire & Cable
Telephone Wire & Cable
Thermostat Cable
Trench Cable
Weatherproof Wire & Cable
Welding Cable

CRESCENT
WIRE AND CABLE
CRESCENT INSULATED WIRE & CABLE CO.
TRENTON, N. J.

Refrigerators (1209)

Crosley is resuming refrigerator production with two models, the SE-746, deluxe, and the SS-746. Both models have food storage capacity of 7.3 cu. ft. and shelf area of 13.81 sq. ft.; the deluxe can make 112 ice cubes at one freezing, the SS-746, 77 ice cubes. New Crosley refrigerators have the Shelvador and feature over-sized freezers, with frozen food storage space and a meat chest with capacity of from 10 to 14 lb. A new one-piece molded plastic door trim is said to give a more efficient seal, and improved engineering on the door prevents warm air from being drawn in. The deluxe model has a new automatic positive seal door latch, a storage bin for articles that do not require refrigeration and two sliding vegetable crispers.

Alarm Clocks (1210)

Alarms to awaken the sleeper gently have been developed by Telechron and are expected to be on the market about the first of the year. The Musalarm is a combination clock and radio, which is set for the selected morning station. An auxiliary buzzer goes off ten minutes after the music starts, in case the sleeper has not been roused.

The Switch Alarm is similar but is not built into a radio. Instead the radio set can be plugged into the clock and the radio is turned on at a predetermined time.

The Lite-Call is of the standard alarm type and has the audible signal. However, it has a mechanism which will make any light or bedside lamp flash intermittently, if the lamp is plugged into the clock. If desired, the audible alarm will come on ten minutes after the flashing alarm.

F Fixture (1211)

Spero Electric Corp. has announced a new glass-shielded fluorescent fixture for four 40-watt tubes. Panels of ribbed, ceramic coated glass are said to have 80% transmission factor and good diffusing qualities. The unit is designed for use without glass where desired.

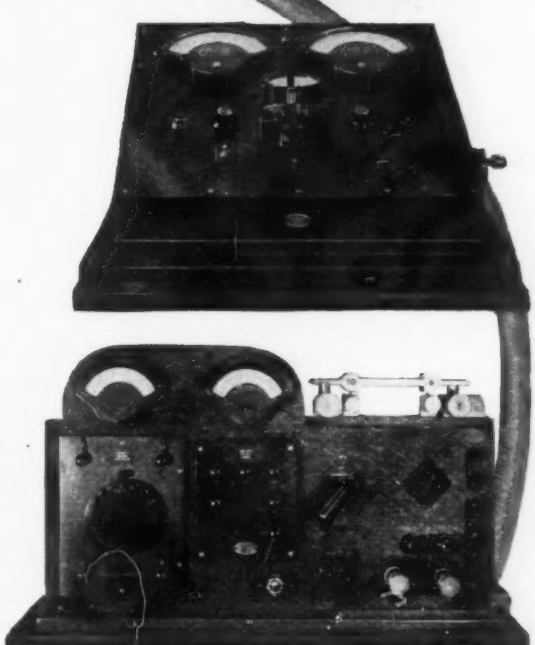
Start RIGHT AND YOU End RIGHT!

with WESTONS ON ALL PRODUCTION TEST-STANDS AND INSPECTION EQUIPMENT!

With the race for markets in full swing, electrical manufacturers are eliminating costly production bottlenecks by providing *uniform dependability* in testing procedure all along the line. From the inspection of purchased components right through to final product inspection, they insure accurate testing by using instruments they can trust.

And it's easy to insure *measurement dependability* at every step, because there are WESTONS for every testing need . . . including types for all special test-stand requirements, as well as a broad line of multi-range, multi-purpose test instruments. These compact, multi-purpose testers often afford new simplicity and economies in testing procedure, while assuring the dependability for which WESTONS are renowned.

Literature describing the complete line of WESTON panel and test instruments is freely offered . . . Weston Electrical Instrument Corporation, 577 Frelinghuysen Avenue, Newark 5, New Jersey.



Weston Instruments

ALBANY • ATLANTA • BOSTON • BUFFALO • CHICAGO • CINCINNATI • CLEVELAND • DALLAS • DENVER • DETROIT • JACKSONVILLE • KNOXVILLE • LOS ANGELES • MERIDEN
MINNEAPOLIS • NEWARK • NEW ORLEANS • NEW YORK • PHILADELPHIA • PHOENIX • PITTSBURGH • ROCHESTER • SAN FRANCISCO • SEATTLE • ST. LOUIS • SYRACUSE
In Canada, Northern Electric Co., Ltd., Powerlite Devices, Ltd.

WHEN YOU Modernize LIGHTING

Check these points!

Certified FLEUR-O-LIER

CERTIFIED ETL

CERTIFIED in accordance with Test Requirements of Specifications of Fleur-O-Lier Manufacturers

ELECTRICAL TESTING LABORATORIES, INC.
NEW YORK, N. Y.
Certifying Agent

1 Make sure that your customers' lighting plans will give them the selling power and atmosphere they want. Our advertising suggests that they consult you.

2 Urge them to take time to get quality lighting fixtures . . . the kind that will give them lasting satisfaction. And one easy way you can help them make sure of such fixtures is to say—

Look for this label

and be sure of the Best!

Because this label means lighting fixtures that are:

1. Built to definite specifications . . . to provide the best in lighting and lamp performance, together with dependable service.

2. Tested and Certified by Electrical Testing Laboratories, Inc. Fixtures are rigidly checked by ETL to make sure they meet Fleur-O-Lier specifications, before they are certified: And periodically, random samples are rechecked.

3. Equipped with Certified Ballasts and Starters. This means better lamp performance, as leading tube makers recognize.

4. Benefited by the latest developments in fluorescent . . . since Fleur-O-Lier's testing and research service brings you the accumulated knowledge of the finest technicians in fluorescent lighting.

And in addition this label lets you choose from a wide variety of fluorescent fixtures, to select the style that fits your needs . . . *and be sure about quality!*

So when you modernize, be sure of the best in fluorescent fixtures . . . look for the Fleur-O-Lier label. Fleur-O-Lier Manufacturers, 2116 Keith Bldg., Cleveland 15, Ohio.

FLEUR·O·LIER *Manufacturers*

CERTIFIED FIXTURES FOR FLUORESCENT LIGHTING

Participation in the FLEUR-O-LIER MANUFACTURERS' program is open to any manufacturer who complies with FLEUR-O-LIER requirements

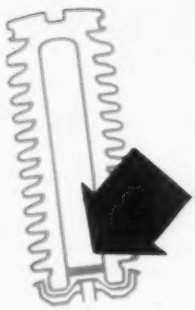
LINE POST LINES HAVE FEWER INSULATOR OUTAGES FROM FLASHOVER

The Line Post design offers an insulator peculiarly adapted to withstand the shattering forces of power arcover. A rugged post body, it attains leakage distance through the device of many short sturdy petticoats rather than few thin, broad, spreading sections. Repeated flashover usually leaves a unit undamaged. If, under severe flash, a unit is fractured, flashover and leakage distances are not reduced enough to impair the serviceability of the insulator.

LAPP LINE POSTS HAVE A DOUBLE FACTOR OF SAFETY...

1 POSITIVE SEAL

The 15-year service record of Lapp Line Posts is witness to the soundness of Lapp techniques of Post construction. One exclusive Lapp feature is a combination porcelain-and-rubber plug which permanently seals the lower end of the post against moisture.



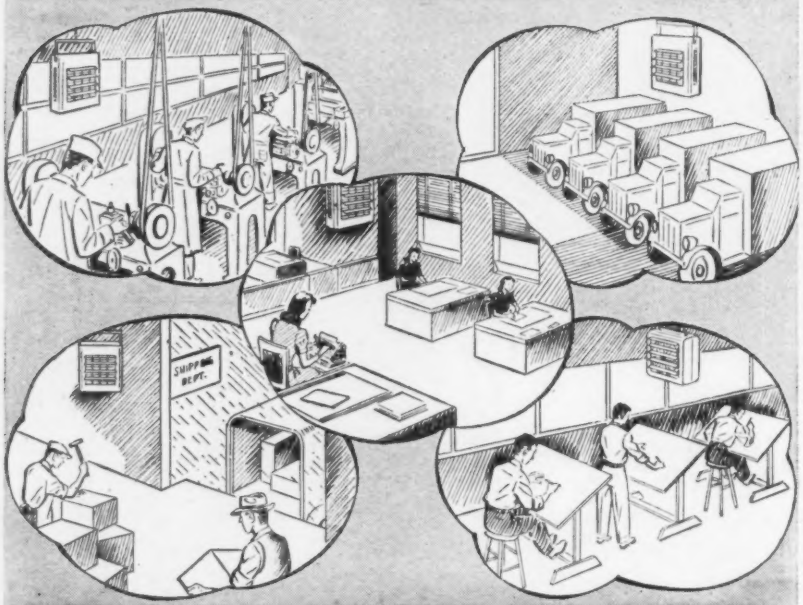
2 NO HIDDEN CRACKS

Failure of any post-type insulator can usually be attributed to unnoticed internal cracks near the head of the insulator. All Lapp posts are fired with the lower end open, permitting critical inspection of finished porcelain before assembly.

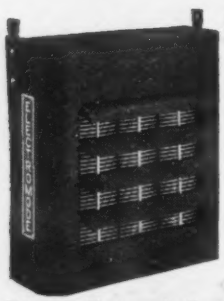
Lapp

LAPP INSULATOR COMPANY, INC., LE ROY, N. Y.

HEATING WHERE YOU WANT IT
Quickly . . . Economically



With ELECTROMODE

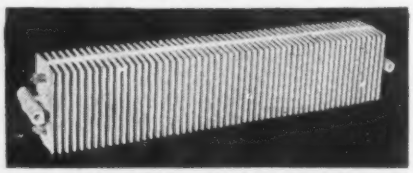


This type Electromode (from 10 to 60 KW) is for suspension mounting only; other models (1.5 to 7.5 KW) for either suspension or portable mounting.

All-Electric Unit Heaters

Have clean, low cost, healthful warm air in-a-minute, anywhere desired . . . in stockrooms, factory areas, warehouses, foundries, isolated buildings, exposed areas, or any section extended beyond installed heating range. Improve efficiency, increase output and guard your employees' health with Electric Unit Heaters. There are no exposed glowing resistors, no incandescent hot wires with Electromodes, yet all the electrical energy is converted 100% into heat, distributed by means of fans and deflectors.

Electromodes owe their great efficiency, long life, freedom from fire or explosion hazard to the special patented heating element. Sheathed electric resistors are cast into and completely embedded in a one-piece finned aluminum casting. Since the fins are an integral part of the casting, there are no dead air spaces to hinder the efficient operation of the grid. Due to the exclusive one-piece design, durable construction and large convection surface, Electromode Unit Heaters have high B.T.U. output at a safe, low operating temperature.



Patented Heating Element . . . No hot wires or glowing resistors. The sheathed resistors are cast in a one-piece finned aluminum casting.

EASY TO INSTALL

No expensive piping or piping connections are required. Electromodes are quickly installed—wherever circuit wires can be run. They are easily removed and relocated as the need develops. Simple to control and economical in operation, Electromodes are made in a wide range of capacities to meet a variety of requirements.

Send for latest Bulletin 45-U and Heating Analysis Survey Form. ELECTROMODE CORPORATION, Div. of American Foundry Equipment Co., 436 So. Byrkit Street, Mishawaka, Indiana.

ELECTROMODE
Electric Unit Heaters

West Coast Representatives
Seattle, Wash.—Fred W. Carlson, 307 Wall St.
San Francisco 3, Calif.—Russell & Co., 1355 Market St.
Los Angeles 15, Calif.—Harry F. Holderman, 1106 So. Hope St.

Modulator Glow Tube (1212)

Sylvania has announced a modulator glow tube of the crater type for facsimile and sound-on-film recording, oscillograph timing markers, stroboscopic devices, seismic recorders and photoelectric counters. Usually operated by the single-ended output stage of a push-pull amplifier, this tube provides a modulated, high-intensity point-of-light source by means of a hollow cathode producing high ionization density which may be viewed in depth. It is supplied in a T-9 bulb with intermediate shell octal base and may be operated in any position. It has a useful light range between 3,500 and 6,500 angstroms and will respond to frequencies between 15 and 15,000 c.p.s.; is rated at 135 watts d-c with currents ranging from 5 to 35 ma.; requires a starting voltage of 170 d-c maximum.

F Lamp for Radio Dials (1213)

Development of a fluorescent lamp producing unseen ultraviolet rays for radio and television dials has been announced by Westinghouse Lamp Division. This screened black light lamp was designed chiefly to improve dial lighting and for improving appearance of radio sets, but, according to the manufacturer, it is expected to find practical application in television, since it will cause receiver control knobs to fluoresce with easy visibility and minimum interference with the image. The rays generated activate the multi-colored fluorescent pigments on the dials. The six-watt lamp is slightly longer than a fountain pen, its luminous length is 7 in. and its over-all length is 8½ in.; diameter is ⅝ in. It is of the non-blink, instant-start type. The transformer which steps up the household current for the radio will double as a transformer for the lamp.

Sunlamps (1214)

Sperti Inc. has two new sunlamps, a portable lamp, said to fit into any traveling or over-night bag, and a deluxe model, which will project either ultraviolet or infrared rays, or a combination. The latter, the Selector, is of the triple reflector type, containing two infrared burners on either side of the ultraviolet generator. It operates on a-c or d-c and can be extended to a height of 80½ in. The small unit, the Aristocrat, operates on a-c or d-c and has an adjusting supporting bracket for hanging or standing.

Sperti is making an iron embodying a heat control on the handle, aluminum sole plate, open handle with built-in cord.

Safety Light (1215)

As an aid to checking home accidents, Westinghouse is offering a walnut-sized fluorescent light bulb, which has a one-watt spherical globe and will be made in pastel green and white. The bulb screws directly into an ordinary light socket or, if the user prefers to plug it into a baseboard outlet, it will be equipped with a bi-prong base. Tests indicate that it will operate for at least a full year, burning night and day.

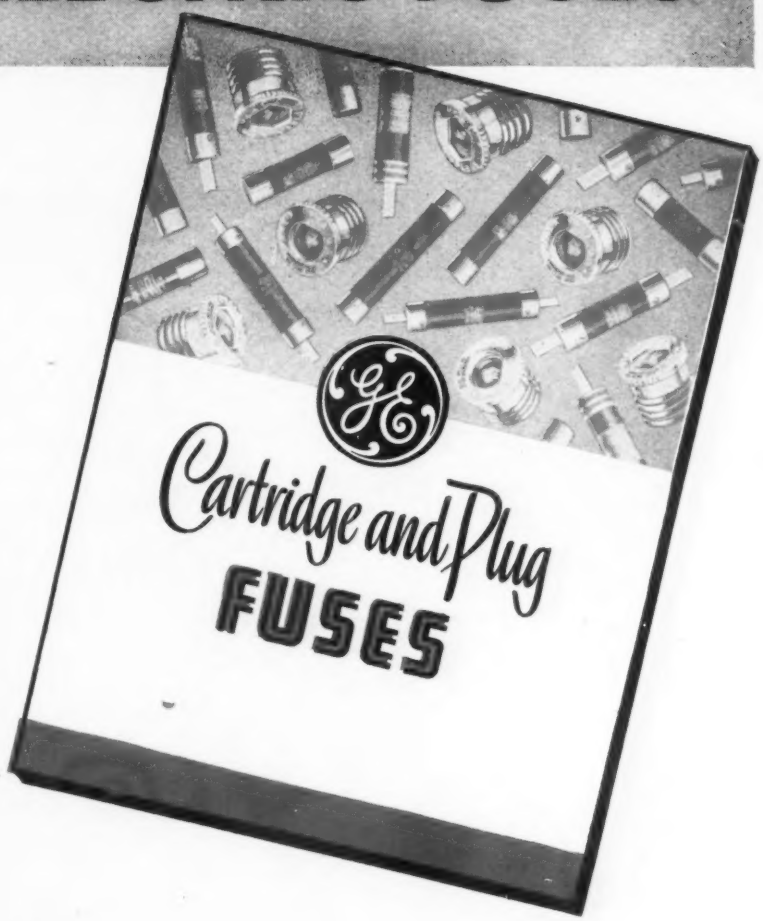
Windowed Lamp (1216)

For store lighting, General Electric has announced new semi-silvered bowl lamps incorporating a circular inside-frosted window through which down light filters. The new lamps are rated at 300 and 500 watts. The former has a window 2¾ in. in diameter, the latter a 3-in. window. List price is $1.20 for the 300-watt, $1.85 for the 500-watt size (plus tax).

Write for New Catalog on

GENERAL ELECTRIC FUSES

Use it to Choose the Fuses for Your Wiring Jobs



Here is a complete presentation of the G-E fuse line giving full details on non-renewable enclosed fuses, renewable enclosed fuses, Silvend enclosed fuses with silver-plated contacts and Pyrex* plug fuses. This catalog will be helpful in choosing fuses for the jobs you are handling. You'll find fuses of the correct type and proper rating for every purpose. All of the fuses shown in the catalog are high quality, thoroughly tested and accurately rated.

In addition to the detailed description of fuses given in the catalog, special descriptions are given of how a fuse operates, of time-current characteristics, of high interrupting capacity and of tests made on fuses. There is also a section in the catalog on the maintenance and care of fuses. You'll like to use this fuse catalog. It contains much useful fuse information. It is generously illustrated and carefully arranged for quick use.

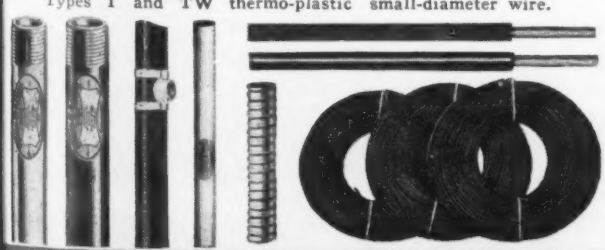
FOR A FUSE CATALOG or for further information on G-E conduits or building wire see the nearest G-E Merchandise Distributor or

MAIL THE COUPON

*Reg. U.S. Pat. Off.

G-E CONDUITS AND BUILDING WIRES

G-E conduits and building wires will meet every requirement. In the line are G-E White zinc-coated rigid conduit, G-E Black enamel-coated rigid conduit, EMT, flexible conduit, Fiberduct and various building wires including Types T and TW thermo-plastic small-diameter wire.



General Electric Co.
Section CDW-1257-18
Appliance and Merchandise Dept.
Bridgeport, Conn.

Sirs: Please send me ☐ the new G-E Fuse Catalog ☐ information on G-E conduits and wire

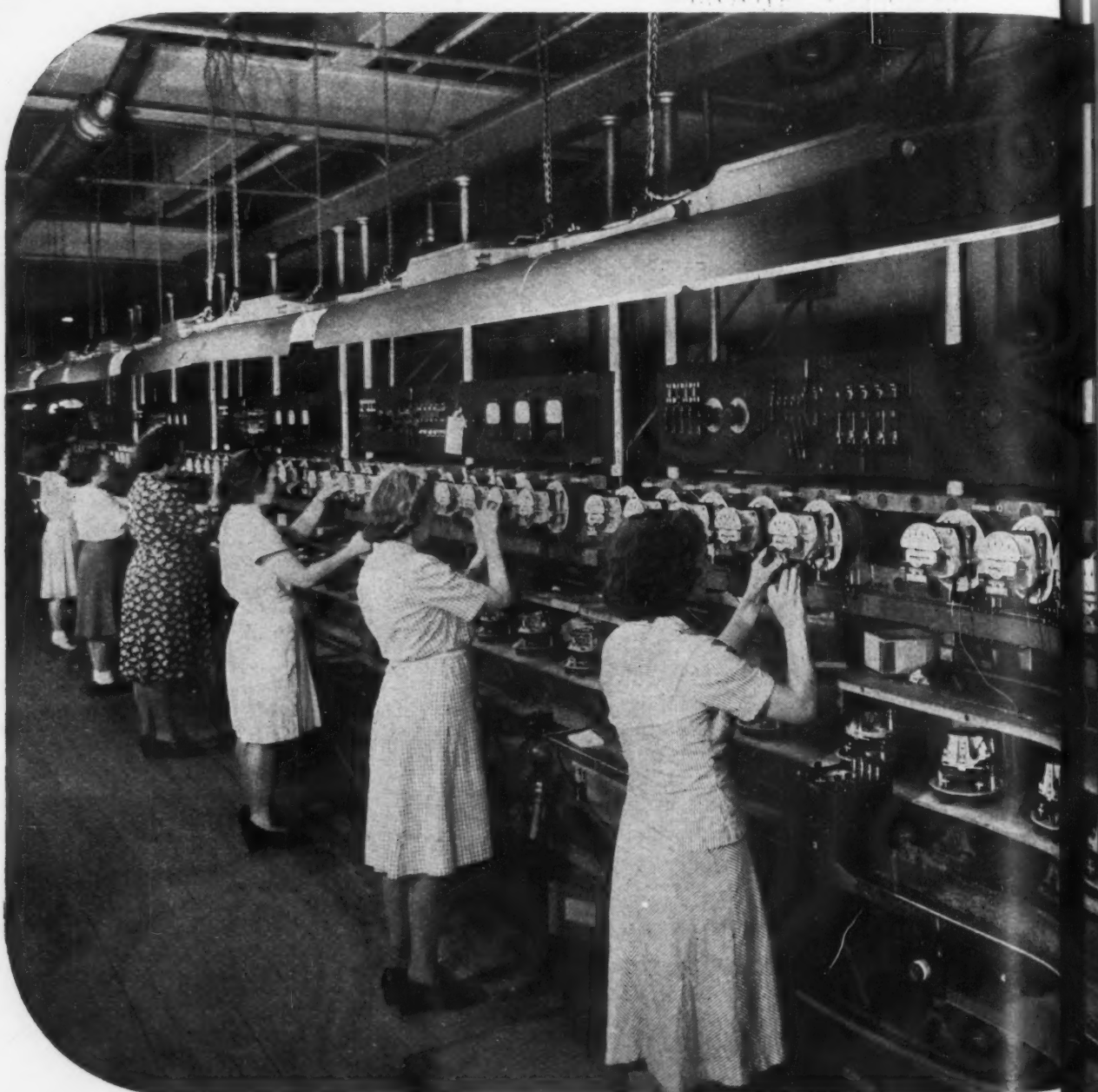
NAME.....

Address.....

City.....State.....

GENERAL ELECTRIC

BUSY TIMES FOR Sangamo TESTERS

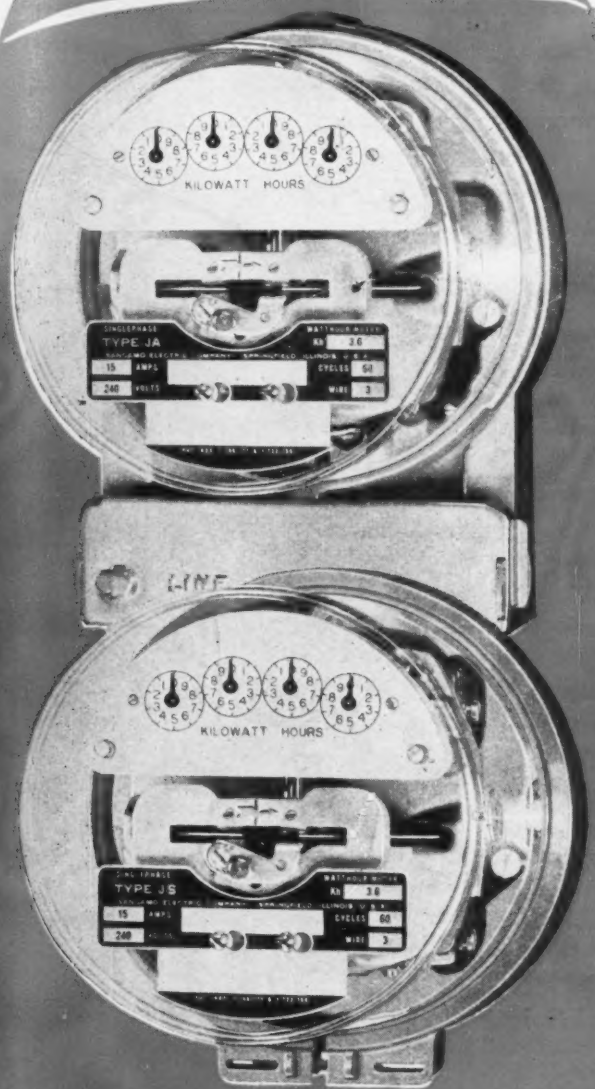


Sangamo Meter Test Line showing Type J Meters being calibrated.

SANGAMO ELECTRIC

ESTABLISHED 1898 • • • WATT HOUR METERS

TO HELP FILL METER NEEDS



Available in either "A" or "S" mountings. Type J Meters are designed for indoor and outdoor service. Ability to measure accurately loads ranging from a small percentage to 400 per cent of the meter's normal full load rating, is an inherent characteristic of the Type J Meter.

★ Providing an adequate supply of watthour meters is a responsibility of which the meter industry is fully aware. In assuming its part of this responsibility, Sangamo is concentrating all its efforts on increasing its production of meters.

These are busy times for the whole Sangamo organization—all doing their share to help fill meter needs.

But the accumulation of meter orders is large. Even the greatly stepped-up production cannot cope with the backlog. Thus, notwithstanding the fact that today's Sangamo meter production almost equals pre-war levels, deliveries will not, for some time, catch up with requirements. Until this shortcoming is corrected and Sangamo Meters are again available on normal delivery schedules, your understanding and tolerance of conditions are of utmost importance.

NO OTHER COMMODITY IS MEASURED SO *Accurately* AS ELECTRIC POWER

COMPANY SPRINGFIELD ILLINOIS

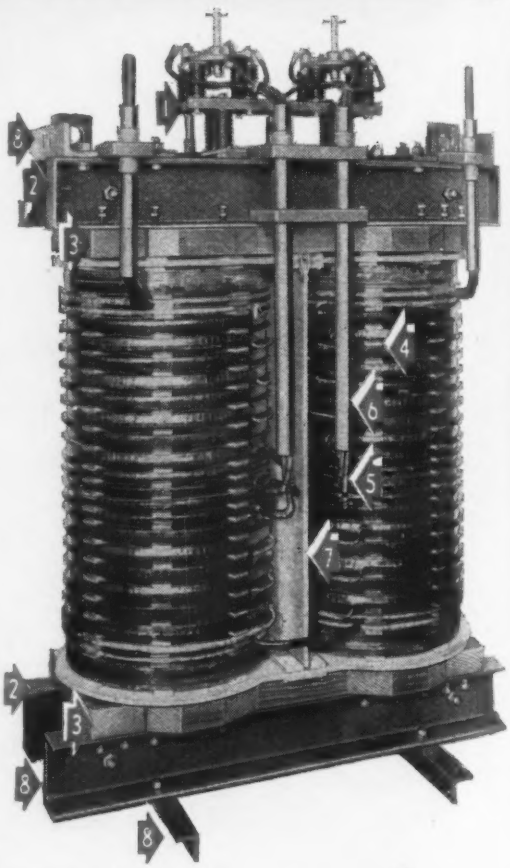
• DEMAND METERS • • • TIME SWITCHES

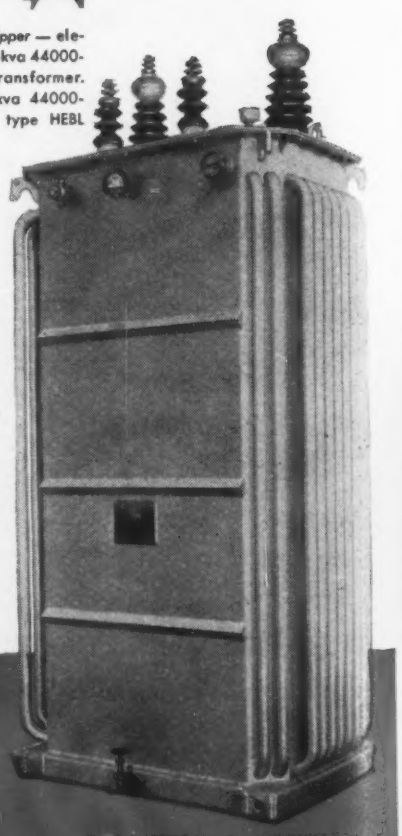
Wagner DISTRIBUTION TRANSFORMERS
Provide a Plus Combination of Superior Characteristics

Wagner transformers have a fine reputation for being able to stand up in service—and there are many reasons, too many to list in the space limitations of a single advertising message.

The features listed below are but a few of many reasons why Wagner transformers stay on the job under severe operating conditions.

1. Tap-changers are carefully mounted to provide high dielectric and mechanical strength with proper alignment.
2. Top and bottom endplates and associated parts are made up of fabricated structural steel forms rigidly bolted together. All nuts are locked in place by means of pal-nuts or other approved shakeproof devices.
3. Coil-clamps of oil-treated maple effectively clamp the coils and prevent distortion under operating conditions.
4. High-voltage single-division coils are separated from each other by insulating washers.
5. Taps are brought out in the middle of the winding where they offer no real problem as far as weakening coils and causing breakdowns.
6. Tap-leads are grouped together and carried thru insulating tubes to the terminal-board or tap-changer. This procedure mechanically supports the leads in the space necessary for proper electrical clearances.
7. Barriers of heavy pressboard between the two legs of the windings prevent flashover.
8. The element is securely braced against horizontal and vertical shifting. The lower clamping members are extended to the dimensions of the tank; the top members are anchored to the tank walls.
9. Low-voltage cylindrical-type coils are amply provided with oil-ducts passing through their entire length, assuring effective cooling throughout the winding.
10. An insulating cylinder supplemented by an oil-duct on each side provides insulation between the high-voltage and the low-voltage coils.





Illustrations: Upper — element of a 333-kva 44000- to 600-volt transformer. Lower — 500-kva 44000- to 2400-volt type HEBL transformer.

TRANSFORMERS are but one of several WAGNER PRODUCTS serving industry.
Other WAGNER PRODUCTS:
AIR BRAKES • BRAKE LINING • HYDRAULIC BRAKES • INDUSTRIAL BRAKES • INDUSTRIAL BRAKE CONTROLS • NoRoL • TACHOGRAPH (Recording Speedometer) • ELECTRIC MOTORS

These 29 Sales and Service Branches Are Ready to Serve You - -

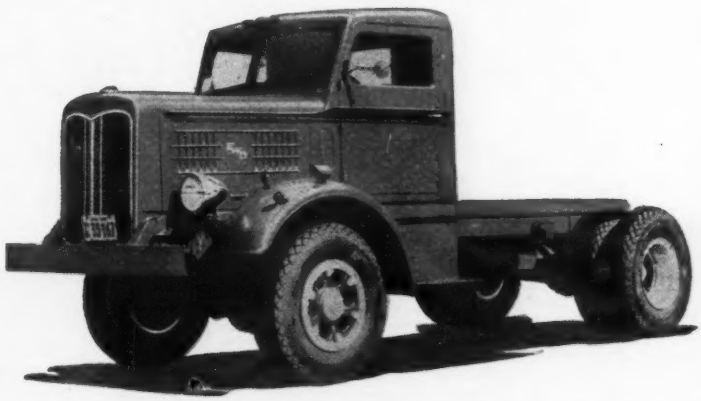
For complete information on Wagner distribution transformers (or other types of Wagner transformers such as power, air-cooled, substation, rural-line, etc.) write to the address below or to the nearest of these 29 branches manned by trained field engineers who are ready to help you solve your transformer problems:

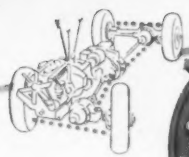
ATLANTA 3 • BALTIMORE 18 • BOSTON 15 • BUFFALO 8
CHICAGO 16 • CINCINNATI 10 • CLEVELAND 15 • DALLAS 1
DENVER 2 • DETROIT 2 • HOUSTON 2 • INDIANAPOLIS 4
KANSAS CITY 8 • LOS ANGELES 15 • MEMPHIS 3 • MILWAUKEE 2
MINNEAPOLIS 4 • NEW YORK 7 • OMAHA 2 • PHILADELPHIA 8
PITTSBURGH 13 • PORTLAND 9 • ST. LOUIS 3 • SALT LAKE CITY 1
SAN FRANCISCO 3 • SEATTLE 4 • SYRACUSE 2 • TULSA 3
WASHINGTON D. C. 5

T45-6A

Wagner Electric Corporation
ESTABLISHED 1891
6381 Plymouth Avenue, St. Louis 14, Mo., U. S. A.
In Canada: Wagner Electric at Leaside, Ontario
ELECTRICAL AND AUTOMOTIVE PRODUCTS

FWDs...the TRUCKS with MORE "GOING POWER" for ALL Season ALL Year Line Construction and Maintenance





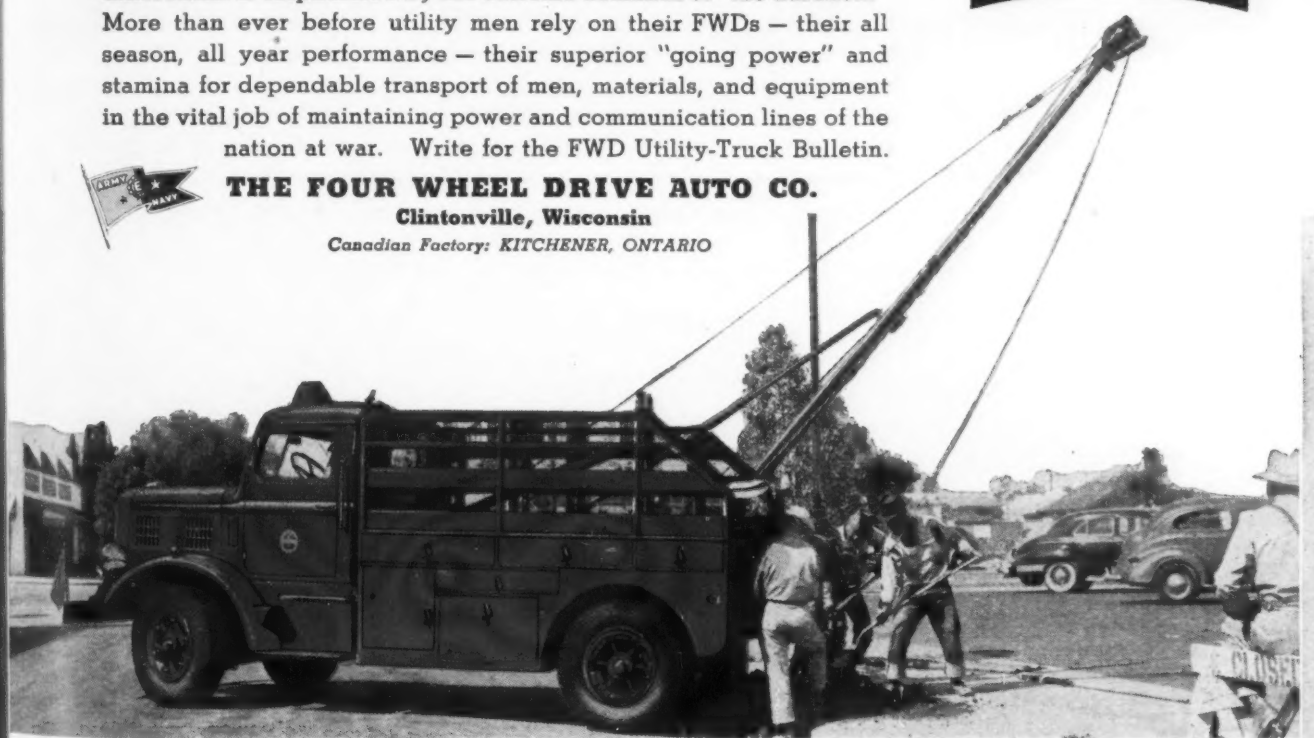
FWD TRUCKS

THE ORIGINAL EXCLUSIVE BUILDERS OF FOUR-WHEEL-DRIVE TRUCKS

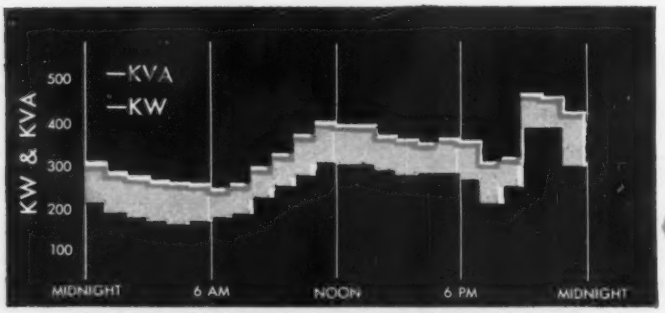
FWD Trucks are engineered and built with four-wheel-drive power, ruggedness and reliability to "take in stride" all the tougher-than-usual line construction and maintenance jobs utilities encounter under war conditions.

The value of FWD's true four-wheel-drive principle with center differential is emphasized by the extreme demands of "the duration." More than ever before utility men rely on their FWDs — their all season, all year performance — their superior "going power" and stamina for dependable transport of men, materials, and equipment in the vital job of maintaining power and communication lines of the nation at war. Write for the FWD Utility-Truck Bulletin.

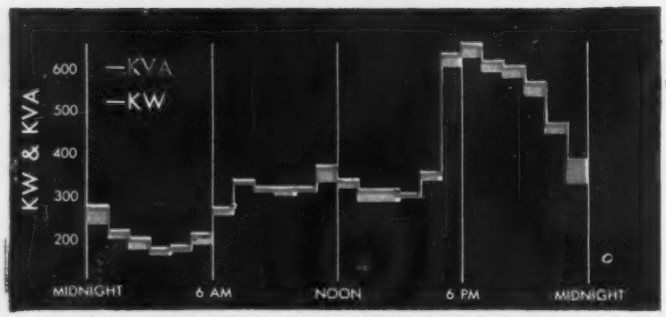
THE FOUR WHEEL DRIVE AUTO CO.
Clintonville, Wisconsin
Canadian Factory: KITCHENER, ONTARIO



FWD **Distributors:** ARIZONA—Arizona-Cedar Rapids Co., 401 N. First St., Phoenix; CALIFORNIA—The Four Wheel Drive Auto Co., 1339 Santa Fe Ave., Los Angeles 21 and FWD Pacific Co., 469 Bryant St., San Francisco 7; COLORADO—Liberty Trucks & Parts Co., P. O. Box 1889, Denver 1; IDAHO—Intermountain Equipment Company, Broadway at Myrtle St., Boise; MONTANA—Steffeck Equipment Co., 11 E. Cutler St., Helena; NEVADA—Allied Equipment Co., Reno; NEW MEXICO—The Myers Company, Las Cruces; OKLAHOMA—Halliburton Oil Well Cementing Co., P. O. Drawer 471, Duncan; OREGON—Feenaughty Machinery Co., 112 S. E. Belmont St., Portland 14; UTAH—Cate Equipment Co., 49 E. 9th So., Salt Lake City; WASHINGTON—Feenaughty Machinery Co., 1028 6th Ave., So. Seattle 2, Glenn Carrington & Co., 91 Columbia St., Seattle, and Feenaughty Machinery Co., 715 N. Division St., Spokane; WYOMING—Wortham Machinery Co., 517 W. 17 St., Cheyenne; ALASKA—Glenn Carrington & Co., Nome, Fairbanks, Anchorage.



Before capacitors were installed—August 1944.



After capacitors were installed—December 1944.

Typical of results obtained with capacitors are these load curves made by a Midwestern utility on a primary feeder supplying both industrial and domestic loads.

Although kw demand was relatively low, there is a decided difference between the kw and kva values. Note that the peak load amounted to 395 kw, while peak demand rose to 470 kva—19% in excess of in-phase load.

The close proximity of kw and kva values *after* Westinghouse Capacitors were installed is clearly indicated. Kw peak reached 615 kw, yet peak kva climbed only slightly higher—5%—to 645 kva. Assuming the load power factor to be identical in both instances, if capacitors had *not* been installed, peak kva would have risen to 730 kva. Thus, Westinghouse Capacitors reduced demand 13%—from 730 to 645 kva, a marked reduction in load current in the feeder and primary substation transformer, effecting a substantial saving in I^2R losses, over the entire 24 hour period. In addition, voltage improvement enables the transmission of more power over the system.

CUT DOWN KVA DEMAND

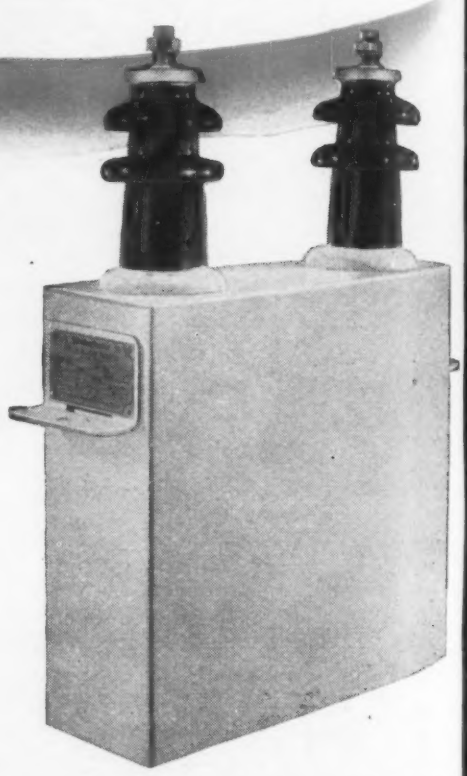
On Primary Feeders with Capacitors

- ★ **Carry more "Metered" load on transformers and feeders.**
- ★ **Reduce Line losses—I^2R.**
- ★ **Improve receiving end voltage.**
- ★ **Eliminate need for added generating capacity in many cases.**

Central Stations, concerned with peacetime power distribution, find that Westinghouse Capacitors provide a simple, fast and economical way to reduce kva demand peaks, make 24 hour per day savings—reduce need for major capital investments.

Westinghouse application engineers are ready to serve you by checking on possible benefits you will derive through installing capacitors. It may save you money to investigate. Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Penna.

J-60624

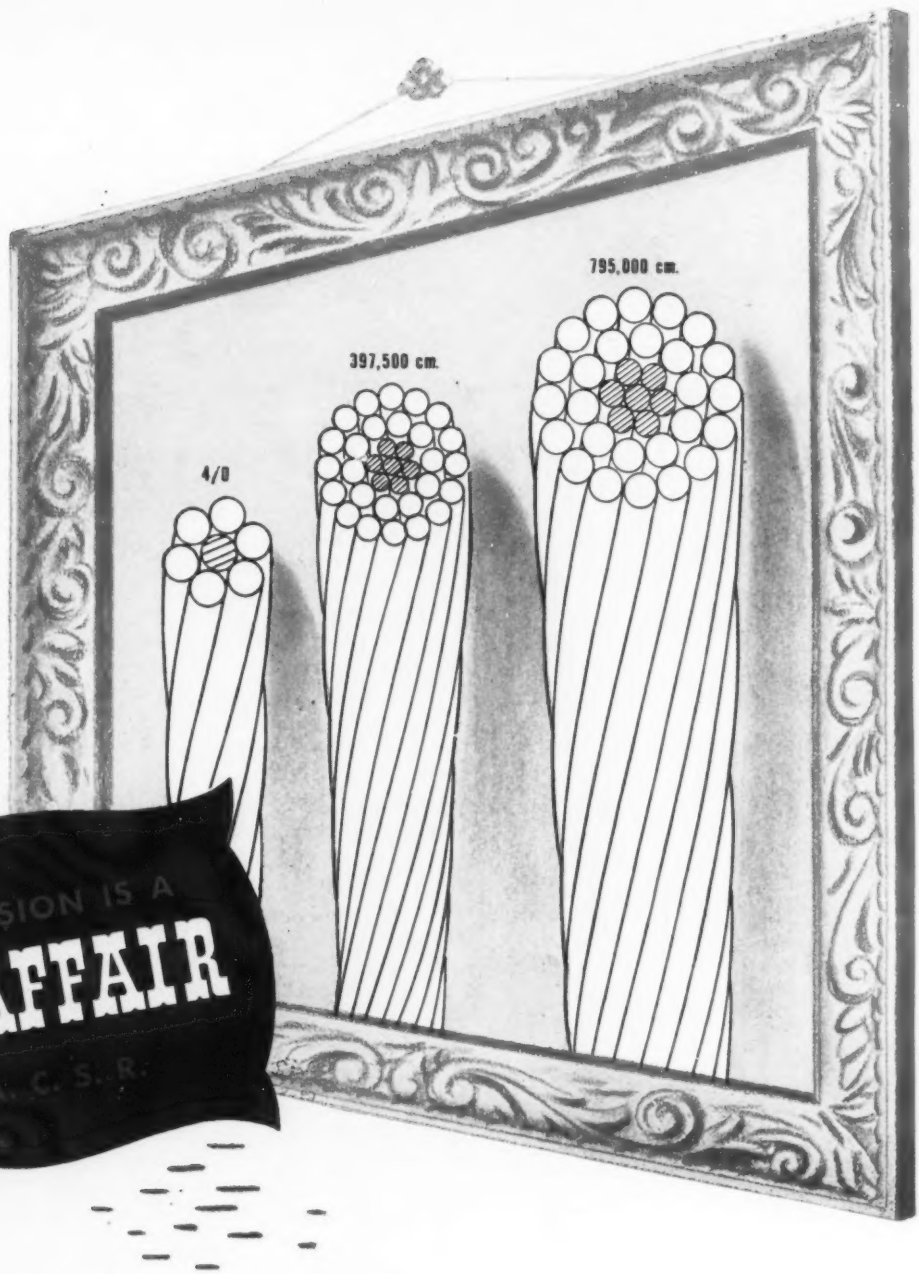


In addition to exclusive Solder-Seal, the perfect bond which eliminates gaskets and seals operating elements hermetically, Westinghouse Capacitors offer new and better protection against the weather. Outdoor hanger-type capacitors are *Zinc-Spray finished*—thus insuring longer life and minimum replacement costs resulting from corrosion.

Westinghouse

PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE

Capacitors



These sizes of Alcoa A. C. S. R. are going into the lines now being built by Bonneville Power Administration.

POWER TRANSMISSION IS A

FAMILY AFFAIR

FOR ALCOA A. C. S. R.

Transmitting electricity may call for conductors with a variety of properties. A suitable blending of conductivity, strength, and weight will answer every requirement. Emphasis on high strength and light weight provides for long spans and mileage economy.

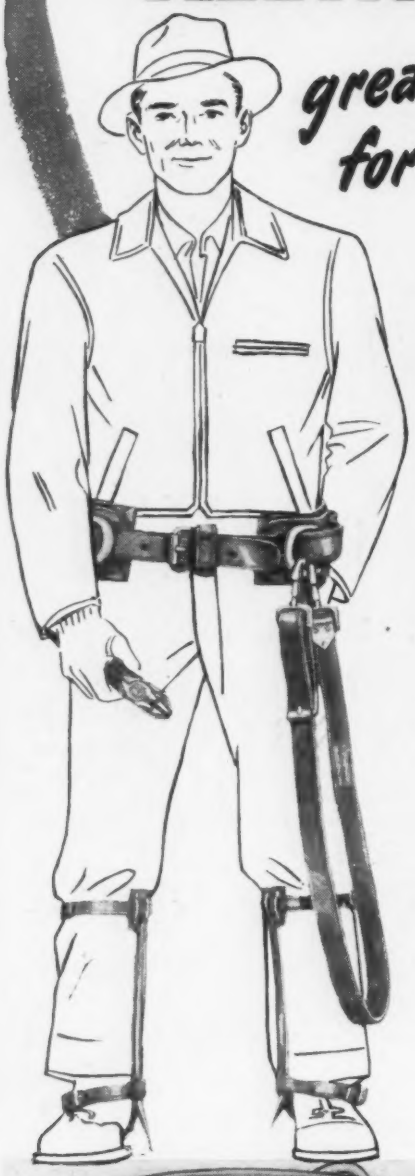
Alcoa's complete line of transmission conductors enables you to use "aluminum" throughout—A.C.S.R. for the largest hi-line and the smallest rural line.

Over 1,200,000 miles of Alcoa A.C.S.R., of one type or another, have been used for power transmission lines. Assisting in the design and erection of many of these lines has given Alcoa engineers a wealth of experience. Why not use it? Write our nearest sales office, or direct to ALUMINUM COMPANY OF AMERICA, at 2132 Gulf Building, Pittsburgh 19, Penna.

ALCOA A-C-S-R

ALUMINUM CABLE STEEL REINFORCED

KLEIN-KORD...
greater safety for LINEMEN!



Klein-Kord Safety Straps, developed more than ten years ago, are today used exclusively by many of the country's largest public utilities.

Multiple plies of long staple cotton of a special weave are vulcanized in rubber. This weave permits the use of a tongue-type buckle without risk of slipping or ripping, even under severe tension and excessive loads. The red center provides a warning signal. The strap is safe for use until worn down to the center ply—"Stop when you see red."

Klein-Kord is extremely tough, flexible, and of uniform thickness and strength. It has a low conductivity, will not stretch, and is unaffected by moisture.

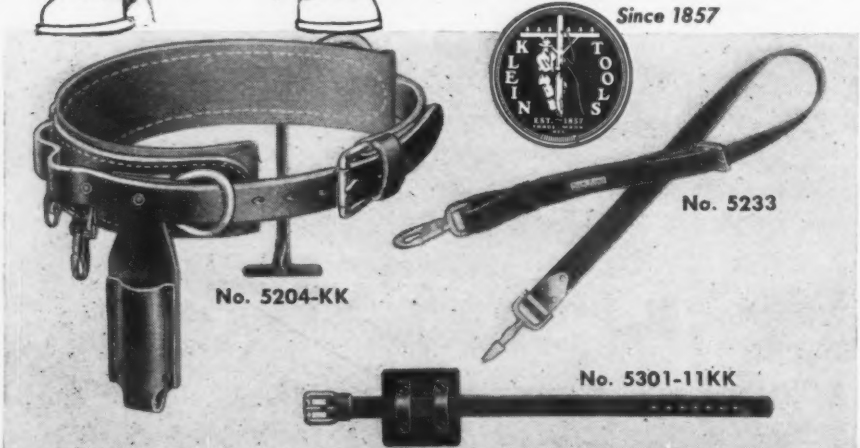
An improved Tool Belt of Klein-Kord is also available. This belt has found favor with linemen, and offers the quality features that have made Klein Belts the choice of linemen for generations.

Klein-Kord is an exclusive Klein development available only on equipment carrying the Klein trade-mark.

Write for book giving full information on Klein-Kord Safety Straps and Belts.

Foreign Distributor:
International Standard Electric Corp., New York

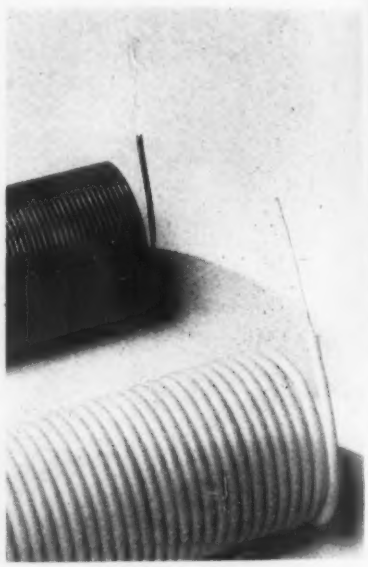
Since 1857



Mathias KLEIN & Sons
Established 1857 — Chicago, Ill., U.S.A.
3200 BELMONT AVENUE, CHICAGO 18, ILLINOIS

Thermoplastic Wire (1217)

A thermoplastic insulated wire has been added to the William Brand & Co. line. Greatly enhanced resistance to high temperatures is claimed for this wire, which is said to possess the general characteristics of plastic insulation in its total resistance to effects of oils, organic solvents, acids, alkalies, sunlight, ozone and oxidation. The manufacturer states that, because of its polyvinyl insulation values, it has breakdown strength in excess of 1,000 volts per thousandth of an inch wall thickness. It is produced in fine stranded and solid conductor type and for the present is restricted in the range of gauges from 24 to 30.



Three-Pole Breaker (1218)

Heinemann has added a three-pole breaker with three trip units that act immediately on short circuit or dangerous overload. The manufacturer states that these circuit breakers have a true inverse time delay in hermetically sealed unit which allows passage of harmless current surges, while continued overload opens the breaker in time inverse to the ratio of the current. The three trip units open simultaneously if an overload occurs in any one leg. This unit is designed for 120/230-volt a-c or 250-volt d-c, 50 amp. maximum. Over-all dimensions: 5¼ in. long, 2-11/16 in. high, 3 in. wide.

Appliance Lead Wire (1219)

A Deltabeston appliance lead wire has been announced by General Electric for use where both heat and moisture are present. The wire is insulated with a moisture-resisting cellulose acetate wrap next to the conductor, a layer of felted asbestos and a lacquered glass braid over-all covering. Maximum operating temperature is 125°C. Colors available are white, red, green, blue, brown or black.

Desk, Bed Lamps (1220)

Orco Industries has announced a new desk lamp and a bed lamp. The desk lamp has a baked enamel walnut finish, is 14⅞ in. high, with felt bottom base 8x5¾ in. Shade size is 10¾ in. long, 4 in. wide, 2⅞ in. deep. The bed lamp takes up to a 100-watt bulb, is 4¼ in. wide, 7¼ in. long and 3 in. deep. It is finished in baked enamel in powder blue, sage green, walnut or antique ivory.

USE THIS COMPLETE BRUSH-TESTING LAB!

FOR FRACTIONAL HORSEPOWER MOTOR BRUSHES

HERE'S a modern laboratory for testing fractional horsepower motor brushes. It's air conditioned . . . equipped with the latest test facilities . . . staffed by experts . . . backed by over half a century's experience in brush manufacturing.

IT'S AT YOUR SERVICE! WE URGE YOU TO MAKE USE OF IT!

This lab relieves you of making countless time-consuming and costly "elimination tests." Here your motors are tested as you would test them yourself . . . under your own specified load, cycle, and test conditions.

From such tests National Carbon Company, Inc. establishes the proper brush grade for any particular model or type of motor, be it Series Universal, Repulsion-Induction, or for low voltage service. And because these tests are most thoroughly conducted you can be sure that the most suitable grade has been applied.

No delays—tests are made promptly! So send in your motors—make use of this lab!

For more details get in touch with our nearest division office.

A FEW OF THE TESTS RUN

Tests are run to determine optimum performance in respect to:

commutation • commutator condition
quietness of operation
brush life • operating temperature

The word "National" is a registered trade-mark of National Carbon Company, Inc.

NATIONAL CARBON COMPANY, INC.

Unit of Union Carbide and Carbon Corporation

UCC

General Offices: 30 East 42nd Street, New York 17, N. Y.

Division Sales Offices: Atlanta, Chicago, Dallas, Kansas City, New York, Pittsburgh, San Francisco

CROUSE-HINDS
FLOODLIGHTS

The illustrations show a representative selection from the dozens of different Crouse-Hinds floodlights — each designed for its particular purpose. Crouse-Hinds lighting engineers will recommend the proper selection and arrangement of floodlights for any application. Send drawings and details.

No. 4
of a series of advertisements which demonstrate that CROUSE-HINDS "complete line" means much more than just a range of sizes—there is a wide variety of highly specialized types in each classification.

Type MDB-8
100-Watt

Type MDB-10
200-Watt

Type MDB-14
500-Watt

Type MDB-16
1000-Watt

Type MUA Elliptalux
750 to 1500-Watt

Type MUA Alumalux
750 to 1500-Watt

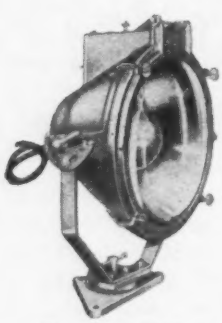
Type ADE-12
Heavy Duty
200 or 250-Watt

Type ADE-14
Heavy Duty
500-Wall

Type ADE-16
Heavy Duty
1000-Watt

Type ADR-14
Heavy Duty
Portable 500-Watt

Type RCDE-8
Explosion-Proof
Portable
200-Watt


Type LCE-1120
Heavy Duty
1500-Watt

Type LCE-24
Heavy Duty
2000-Watt

Type RCDE-8
Explosion-Proof
200-Watt

Type RMC-8
Wall Mounting
100-Watt

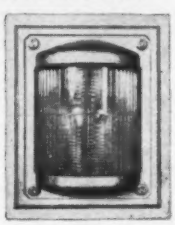
Type RCD-8
Wall Mounting
100 to 200-Watt

Type RCD-8
Floor Mounting
100 to 200-Watt

Type RMF-12
Wall Mounting
150 or 200-Watt

Type FS
Floor Lighting
25-Watt

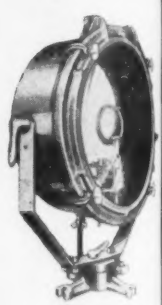
Type VCD-6
Roadway Lighting
60 to 100-Watt


Type VCD-12
Roadway Lighting
200-Watt

Type SPS for
underwater lighting
of swimming pools

Type GCP-14 Lantern
300 to 1500-Watt

Type RLEE-14
Explosion-Proof
500-Watt


Type DCE-18
Long-Range Searchlight

Type DCX-18
Long-Range Searchlight

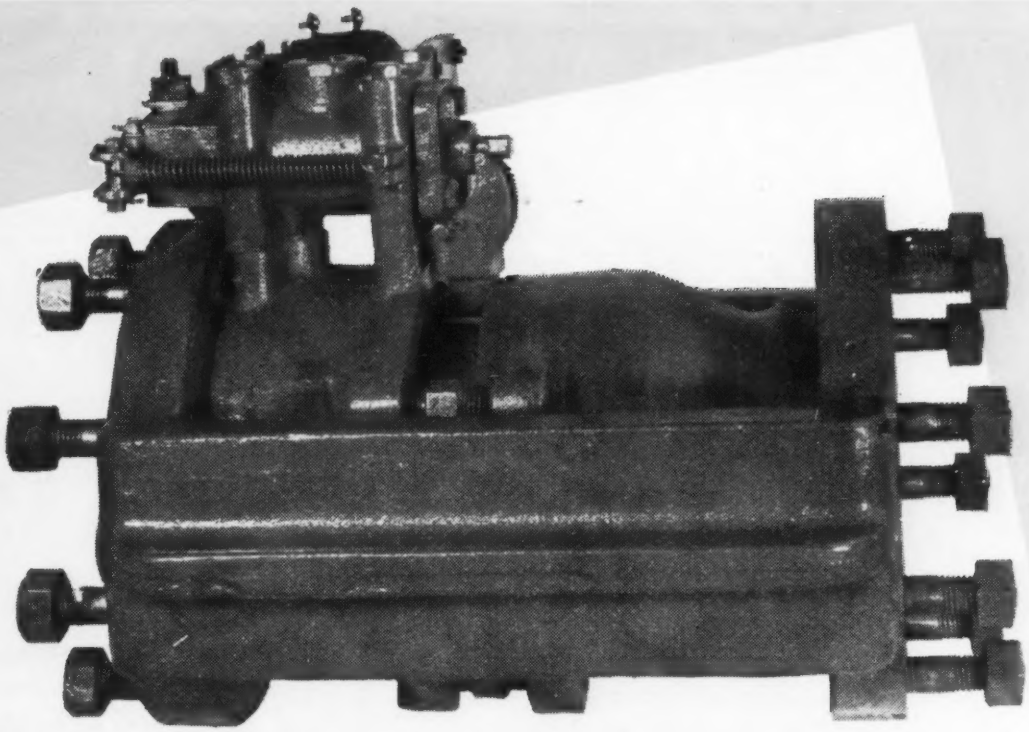
A Nationwide Distribution Through Electrical Wholesalers

CROUSE-HINDS COMPANY
Syracuse 1, N. Y., U.S.A.

Offices: Birmingham — Boston — Buffalo — Chicago — Cincinnati — Cleveland — Dallas — Denver — Detroit — Houston — Kansas City — Los Angeles — Milwaukee — Minneapolis — New York — Philadelphia — Pittsburgh — San Francisco — Seattle — St. Louis — Washington. *Resident Product Engineers:* Albany — Atlanta — Charlotte

CROUSE-HINDS COMPANY OF CANADA, LTD., *Main Office and Plant:* TORONTO, ONT.

CONDULETS · TRAFFIC SIGNALS · AIRPORT LIGHTING · FLOODLIGHTS



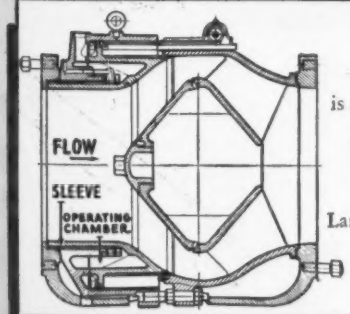
PATENT PENDING

PELTON Sleeve Valve

- **LOWER MAINTENANCE COST—VALVE REMOVABLE WITHOUT DISCONNECTING THE PIPE LINE**
- **EASY OPERATION—FULL HYDRAULIC CONTROL WITH HAND VALVE OR SOLENOID**
- **LOW HEAD-LOSS—CAREFUL HYDRAULIC DESIGN**

Uses

1. *Free Discharge*
2. *Slow-Closing Check Valve*
3. *Line Throttling*
4. *Altitude Service for Controlling Water Level in Reservoir*



The Pelton Sleeve Valve is made in sizes from 4" dia. and up. Uses are similar to those of Larner-Johnson Valves

The Pelton Sleeve Valve saves time when maintenance is needed because *its frame remains connected to the pipe line.*

By releasing a few double-thread jack screws the entire operating mechanism is easily collapsed and removed.

The sleeve opens or closes when pipe-line water is discharged from or admitted to the operating chambers, either by solenoid action or by turning a small hand valve. The operating chambers are hydraulically balanced with the pipe-line water. Therefore, the sleeve will easily open or close at a controllable speed.

Its head-loss is low because of streamlining.

Made by the Pelton Water Wheel Company, known throughout the world for 65 years as designers and builders of hydraulic equipment, the Pelton Sleeve Valve is precision built with bronze seating rings and carefully-machined parts to endure hard service. It is used by some of the largest municipalities. Here is your assurance of valves with lower maintenance costs, easier operation, low head-loss and reliability.

BLW THE BALDWIN GROUP

The PELTON WATER WHEEL Company

A Subsidiary of the Baldwin Locomotive Works

2929 NINETEENTH STREET • SAN FRANCISCO 10, CALIFORNIA

Refer Eastern Inquiries for the Pelton Sleeve Valve to Chapman Valve Manufacturing Co., Indian Orchard, Mass.

Certified Ballasts

..builder of lasting customer good will!

Yes sir, fluorescent fixtures equipped with Certified Ballasts can do a lot to increase customer good will. Because they not only mean satisfactory performance *longer* . . . but also fewer service troubles for your sales representatives.

And here's why:

1. **Certified Ballasts are quality built** . . . made to definite specifications . . . to assure better lamp performance. Leading fluorescent tube manufacturers recognize this—since with Certified Ballasts in a fixture, they will guarantee lamp performance.
2. **Certified Ballasts are E.T.L. checked.** Sample ballasts are thoroughly tested by famous Electrical Testing Laboratories, Inc., before they are certified as meeting Ballast specifications. Random samples are periodically rechecked at the laboratory and at the factories.
3. **Certified Ballasts help assure top performance** in fluorescent lighting units that use them . . . dependable service, too. *And your customers know it.*

How about taking advantage of this for your fixtures? Give them the prestige, dependability and assurance of continuing customer satisfaction that Certified Ballasts can provide!

Certified Ballast *Manufacturers*

MAKERS OF BALLASTS FOR CERTIFIED FLUORESCENT LIGHTING FIXTURES

CHICAGO TRANSFORMER CORP.
3501 Addison St., Chicago, Illinois

DONGAN ELECTRIC MFG. CO.
2987-3001 Franklin St., Detroit, Mich.

GENERAL ELECTRIC CO.
Specialty Transformer Section
1635 Broadway, Fort Wayne, Ind.

JEFFERSON ELECTRIC CO.
Bellwood, Illinois

SOLA ELECTRIC CO.
2525 Clybourn Ave., Chicago 14, Illinois

WHEELER INSULATED WIRE CO.
378 Washington Ave.,
Bridgeport, Conn.

CORNELL-DUBILIER DESIGNS A BETTER CARRIER CURRENT COUPLING CAPACITOR

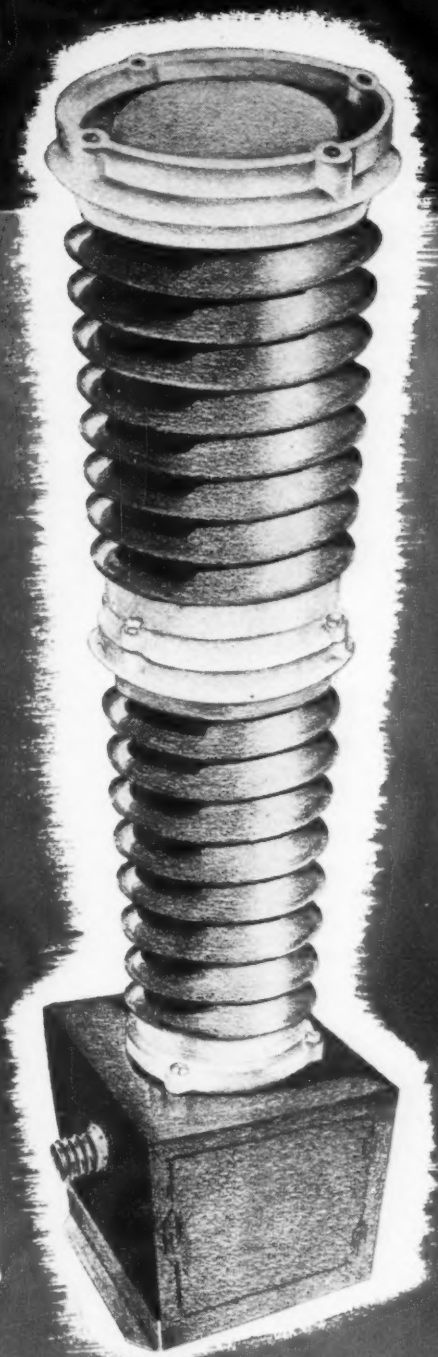
OUTSTANDING IN QUALITY AND PERFORMANCE

Typical of Cornell-Dubilier's improvements in capacitor quality and design is the enlarged Type CA unit for carrier current coupling

Type CA's fog-type petticoats provide a large creepage path between terminals . . . are designed for low resistance at high frequencies. Galvanized malleable iron mounting flanges permit stacking for high voltage connection. The base and top are specially sealed for leak-proof service. New inner construction gives great tensile strength.

Investigate the advantages of this Type CA carrier current coupling capacitor. Your local C-D Field Engineer will be glad to answer your questions or write us direct. Cornell-Dubilier Electric Corporation, South Plainfield, New Jersey.

An installation of C-D Type CA Capacitors for coupling carrier communication and signalling on a 110,000 volt, 3 phase grounded neutral line. Each capacitor is rated 76,000 volts. The base is large enough to accomodate the mounting of auxiliary potential equipment.



Cornell-Dubilier Capacitors

FOR POWER FACTOR IMPROVEMENT

CARRIER CURRENT COUPLING • SURGE PROTECTION

Cole Electric Co.

1510 South Los Angeles Street
PRospect 2068
LOS ANGELES 15, CALIFORNIA

•

POWER PLANT EQUIPMENT

AIR BREAK SWITCHES
MANUALLY OPERATED

AIR BREAK SWITCHES
MOTOR OPERATED

DISCONNECTING SWITCHES

BUS AND CABLE FITTINGS

BUS AND CABLE SUPPORTS

FUSE MOUNTINGS

FUSES

SWITCHBOARDS

INDUCTION RELAYS

MARINE EQUIPMENT

SWITCHBOARDS

ELECTRICAL EQUIPMENT RELAYS

AIRPLANE EQUIPMENT

BOMB RACKS

SWITCH HOUSINGS

THROTTLE SWITCHES

LIMIT SWITCHES

OIL FILLED SWITCH HOUSINGS

SWITCHBOARDS

RELAYS

•

Pacific Coast Representatives

EICHER & BRATT
Colman Bldg., Seattle 4, Washington • • Eliot 2722

EARL S. CONDON COMPANY
357 S. Hill St., Los Angeles 13, Calif. • • MI. 2831

Low-Brightness F Lamp (1221)

Designed to give good quality illumination without so much accessory shielding as required for standard fluorescent lamps, a low brightness, 40-watt 4,500-white F lamp in the 100-watt bulb size has been made available by General Electric. For most uses, the manufacturer states, longitudinal shielding only will be needed, since use of the 40-watt lamp in a bulb normally used for the 100-watt lamp gives slightly more than one-half the brightness of the standard G-E 40-watt, 48-in., T-12 white F lamp. The new lamp is instant starting, has mogul bipin base, shorted base pins. Standard mogul bi-pin lampholders can be used, as can regular instant start ballast designed for 40-watt lamps. Regular preheat 40-watt ballasts can be used with the new SS-400 Jack Rabbit split-second starter, when available. Rated initial lumens of approximately 2,000. List price $2.15 plus tax.

Ballasts (1222)

General Electric has two new special ballasts, one a single-lamp type designed for the new line of 13-watt Mazda F lamps, the other, in either single or Tulamp models, is for instant-starting operation of the new Slimline lamps. The former is for use on 118-volt, 60-cycle circuits and is equipped with a step-up autotransformer providing 200 volts; is available in either uncorrected or high power factor ratings. The latter models can be secured for operation at 100 or 200 ma. and are of the high-voltage type. The single-lamp type is available in both uncorrected and high power factor ratings, the Tulamp is of high power factor design.

Immersion Heater (1223)

Edwin L. Wiegand has a new Chromalox electric immersion heater for compounds supplied in 55-gal. drums or similar containers. This type DH heater is available for 115 to 230 volts, single phase in ratings up to 5,000 watts. The heater is placed in the drum and allowed to melt to the bottom, weight of the heater causing it to settle rapidly. An adjustable thermostat limits the operating temperatures it the heater is allowed to operate unattended. A large circular heating element is used. Steel risers allow all electrical connections to terminate in a standard conduit box, and an eyebolt at the top of the assembly permits easy handling.

Hot Line Clamp (1224)

Fargo Mfg. Co. has a new A.G.E.-1 hot line clamp with annealed vanadium steel pressure spring, claimed to prevent loosening contact arcing. The V-groove jaw construction of the clamp gives four points of contact on the conductor. Bolt thread is housed in a casing filled with anti-corrosion lubricant. This clamp is built so that any standard hot stick can be used for installation according to the manufacturer.

Triode Tube (1225)

Taylor Tube has developed a new ultra high frequency triode, known as TUF-20, which will operate at full ratings up to 250 MC and at reduced ratings for higher frequencies. This tube was designed primarily for mobile application. It has an instant-lighting, thoriated filament, said to permit power conservation during standby periods but to be capable of being brought quickly up to maximum operating temperature.

Better Construction Today— *Less* Maintenance Tomorrow

KEARNEY PROTECTED THREAD CON-NEC-TAP CLAMP

Grease filled chamber houses screw—prevents corroding. Line connection stays tight—spring washer maintains constant pressure. Vibration or expansion and contraction won't loosen their grip.

KEARNEY TRIP-O-LINK FUSE CUTOUT

For practical and dependable low cost protection. Single unit link and cartridge construction provides new arc-extinguishing cartridge with each fuse replacement. Also available in two-shot and three-shot reclosing types.

KEARNEY HI-LINE DISCONNECT STICK

Light, yet stands much abuse. Ferrule type metal head. Kearney takes special care in selecting and treating laminated poles for Hi-Line tools used on hot line work.

KEARNEY CON-NEC-TITE

Reduce costs with these permanent, positive, solderless connectors. Fast and easy to use.

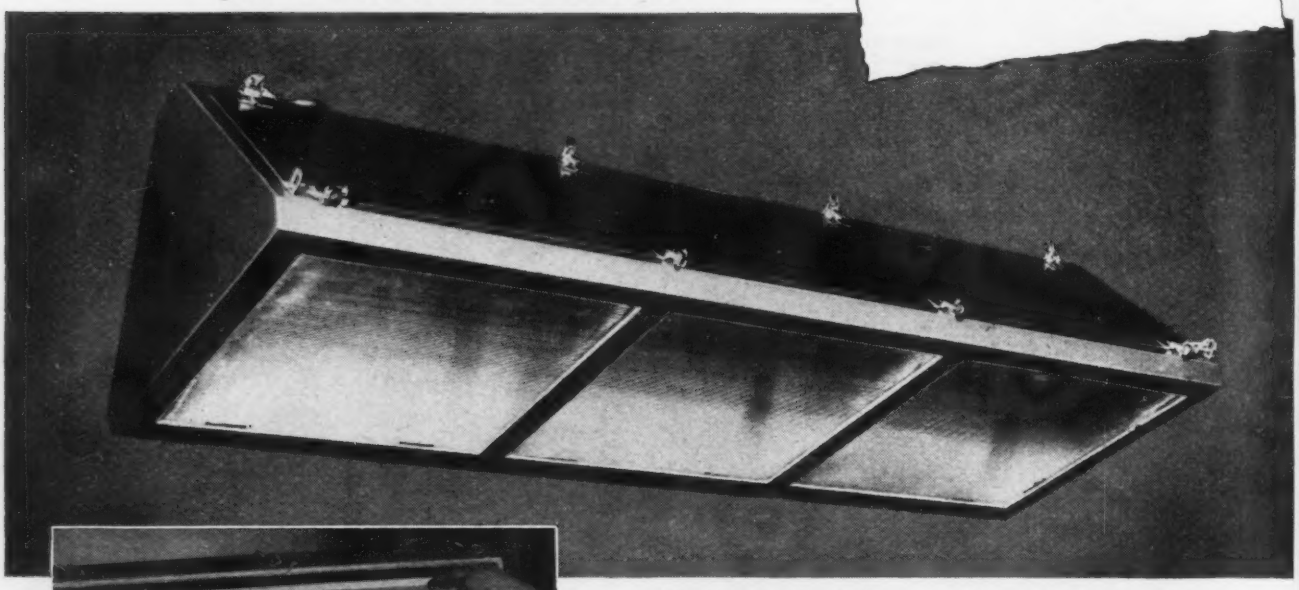
KEARNEY PRODUCTS

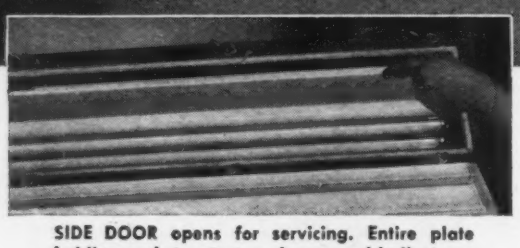
MAYDWELL & HARTZELL
INCORPORATED
LOS ANGELES • SAN FRANCISCO • PORTLAND

★Dust-Tight CONTROLESCENT UNIT that stays Dust-Tight

for ✓CONTROLLED INDUSTRIAL LIGHTING
✓DUST AND DIRT EXCLUSION
✓EASY SERVICING & MAINTENANCE

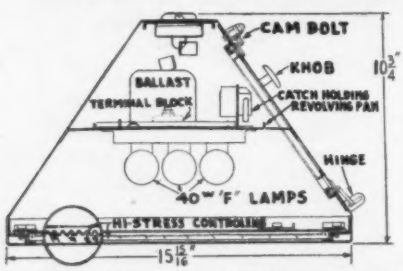
Holoflux
HOLOPHANE | FLUORESCENT



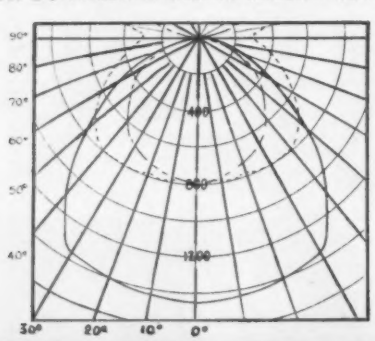


SIDE DOOR opens for servicing. Entire plate holding sockets, starters, lamps and ballast can be rotated for cleaning or inspection; plate can be removed and replaced through door.

Holoflux Unit No. 9061 . . . Accommodates three 40 Watt Fluorescent Lamps . . . (No. 9062 for two lamps)



Above: Cross-Section...Below: Distribution Curve 9061



- **THREE HOLOPHANE HI-STRESS CONTROLENSES** (Smooth outside) permanently sealed in bottom of unit.
- **DUST-TIGHT CONSTRUCTION** resists dust and dirt, reduces depreciation to a minimum.
- **UNIT GIVES INTENSIVE LIGHT DISTRIBUTION**; most efficient because of low interception loss.
- **GLARE** is effectively prevented by Controlens redirection of high angle (wasteful) light to useful areas.
- **HI-STRESS CONTROLENSES** withstand mechanical and thermal shock.

★ **APPROVED BY UNDERWRITER'S LABORATORIES** for Class II Groups E, F, G

Consult Holophane Engineering Service . . .
Write for Data Sheets . . . No obligation.

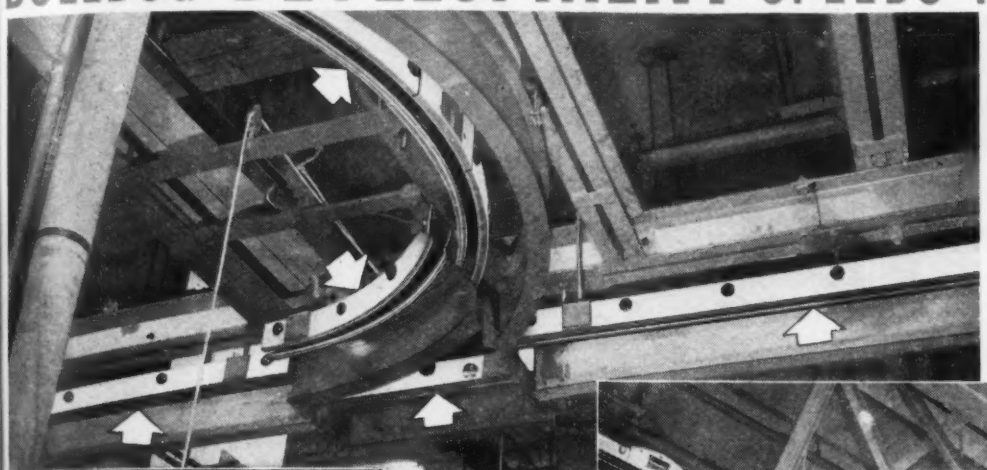
ARMY E NAVY
Holophane Trade Mark

HOLOPHANE COMPANY, INC.... *Lighting Authorities Since 1898*

342 MADISON AVENUE, NEW YORK 17 • Holophane Co., Ltd., 385 Yonge St., Toronto, Can.

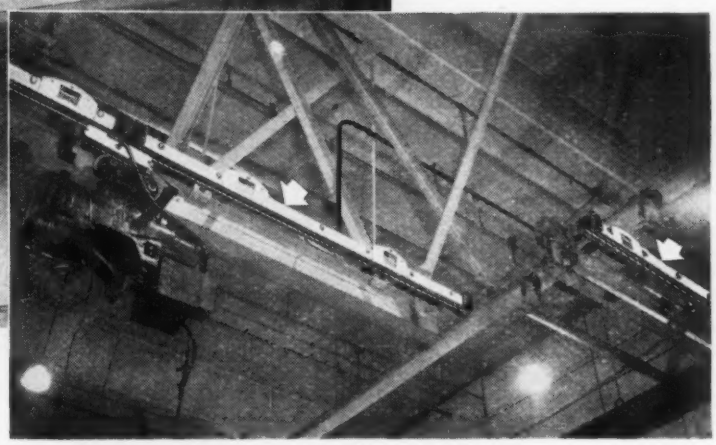
Pacific Coast Representatives:—R. G. Dummel, San Francisco; F. van Gilluwe, Los Angeles
Distributors, General Electric Supply Corp.

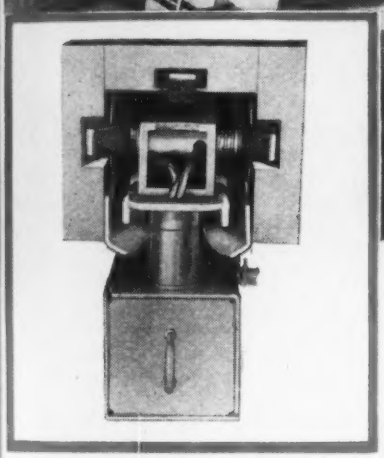
BULLDOG DEVELOPMENT SPEEDS PRODUCTION!



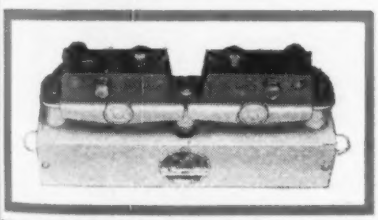
Monorail Hoist switching application; switching from curved to straight Industrial Trol-E-Duct run.

Transfer Crane and Hoist installation using flared ends Industrial Trol-E-Duct and Transfer Type Trolleys.

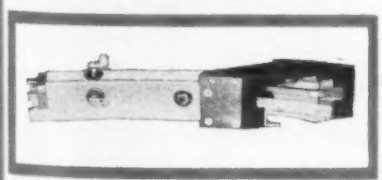




Cross sectional view of Flared End Duct and Transfer Trolley.



Transfer Type Trolley for Crane and Hoist transfer or switching.



Close-up of Flared End for Curved Industrial Trol-E-Duct.

CRANE AND HOIST SWITCHING AND TRANSFER PROBLEMS SOLVED!

Again BullDog pioneers a new and better way for transferring loads mechanically and electrically from crane bays to individual factory areas. Monorail transfer and switching is also made easier and more flexible.

This is accomplished by electrical Transfer Trolleys with swiveled heads moving through Duct runs having flared ends to facilitate transfer to similar runs in adjacent bays.

In these installations straight or curved runs of electrical Trol-E-Duct are attached to and move with the Crane and Hoist equipment to furnish a safe, smooth and speedy means of transferring or switching material to or from any part of the plant.

Your Crane and Hoist jobs will run smoother, safer and speedier in conjunction with these improved features of Industrial Trol-E-Duct.

BullDog field engineers are available for consultation—or write us if you prefer.

BULLDOG

ELECTRIC PRODUCTS COMPANY

DETROIT 32, MICHIGAN.
In Canada:
BullDog Electric Products of Canada, Ltd., Toronto.
Field Offices in All Principal Cities.

Also Manufacturers of
SafToFuse Panelboards—Switchboards—Circuit Master Breakers—Universal Trol-E-Duct, for flexible lighting—Industrial Trol-E-Duct, for movable "loads"—BUS-tribution DUCT, for "Plug-In" Power.

BULLDOG PRODUCTS ARE SOLD AND DISTRIBUTED BY THE FOLLOWING PACIFIC COAST REPRESENTATIVES:

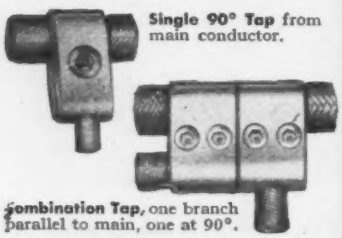
Coast Electric & Manufacturing Co.
1720 N.E. Sixth Avenue
Portland, Oregon, Tel. Garfield 2844

Safety Switchboard Company
1445 Stevenson St.
San Francisco, Calif., Tel. Hemlock 2470

Mullenbach Electrical Manufacturing Co.
2300 East 27th Street
Los Angeles, Calif., Tel. Jefferson 2224

It's Easy to pick the right CABLE TAP— **from the *Complete* line**

You'll find the widest variety of parallel and 90° taps, combinations, and gutter taps—in a range of sizes up to 1,000,000 cm. Insulating Bakelite covers can be furnished for all types.

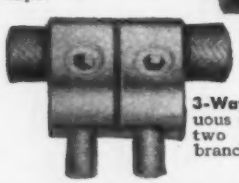


Single 90° Tap from main conductor.

Combination Tap, one branch parallel to main, one at 90°.

Bakelite Covers can be furnished for all types of Penn-Union cable taps.

2-Way Gutter Tap.



3-Way; continuous main and two separate branches.

KENNETH ANDERSON CO.
334 East 4th St., Los Angeles

NORTHWESTERN AGENCIES
2411 First Ave., Seattle, Washington

F. M. NICHOLAS CO.
1123 Harrison St., San Francisco

Penn-Union Electric Corp., Erie, Pa.

PENN-UNION
Conductor Fittings

BULLETINS

data books, etc.

Bulb Uses (1226)

"Big Jobs for Small Bulbs" is the title of a brochure published by General Electric Lamp Department. Stressing the advantages of beauty, convenience, safety, utility, sales appeal and time-saving, this publication suggests novel applications for small lamps.

Sketches, some of them of patented manufactured articles, some original ideas, show applications for illuminated dials, indicators, tools, household devices, appliances, safety devices, toys, coin machines and miscellaneous devices.

G-E also has released another of its lighting perspective series, this one on flexible lighting to step up furniture and appliance displays.

Capacitor Color Codes (1227)

Cornell-Dubilier Electric Corp. is offering a pocket-sized card giving standard color codes for marking mica capacitors, including the RMA standards for the six-dot and the three-dot color codes, as well as the Army and Navy standards. Basis of the code is use of a distinct color for every number from zero to nine inclusive.

Air Disinfection (1228)

Art Metal Co. has released a brochure on electronic air disinfection. Non-technical information on germicidal ultraviolet and the nature of air-borne bacteria is included, in addition to installation data pertaining to the company's equipment.

Catalogue (1229)

Jefferson Electric Co. has a new 12-page catalogue, listing its major products. Transformers for various fields are described and pictured, and information is given on ballasts, renewable and non-renewable fuses, fustats, plug fuses and solenoids.

Photographic Lamps (1230)

A 20-page booklet listing photographic and projection lamps has been prepared by Westinghouse. Application information, specification tables on rating, bulb shape and diameter, temperature, lumens, etc., and curves indicating time-light characteristics are given.

Home Receivers (1231)

United States Television Mfg. Corp. has released a folder picturing and describing its 1946 home radios, radio-phonographs and television receivers.

Steel Facilities (1232)

Bethlehem Steel facilities on the Pacific Coast are treated in an illustrated 32-page bulletin recently issued by the company.

Plastic Applications (1233)

Applications of moulding compounds, resin adhesives and laminating resins are discussed by American Cyanamid Co. in an external house magazine, "Plastics Newsfront," first issue of which was released recently.

Ballasts (1234)

American Transformer Co.'s line of ballasts for fluorescent lighting and germicidal lamps is described in a four-page folder offered by the company. Price list included.

Quench Furnaces (1235)

Ajax Electric Co. is distributing an eight-page bulletin devoted to its Isothermal Quench furnaces. The process is described and the equipment listed. Photographs, tables and diagrams supplement the text.

For the Food Industry (1237)

Electric equipment for the food industry is covered in a 24-page bulletin offered by General Electric. A guide to selection of motors and controls for food processes is given in tabular form and the various equipment is described and pictured.

Thermocouple Data (1236)

Wheelco Instruments Co. has prepared a new edition of its thermocouple data book and catalogue, giving information on selection and installation.

ELECTRICAL WEST, 68 Post St., San Francisco, 4, California
Please send me information about following CIRCLED items:

1200	1201	1202	1203	1204	1205	1206	1207	1208	1209
1210	1211	1212	1213	1214	1215	1216	1217	1218	1219
1220	1221	1222	1223	1224	1225	1226	1227	1228	1229
1230	1231	1232	1233	1234	1235	1236	1237		

Name..... Company*..... Title*.....

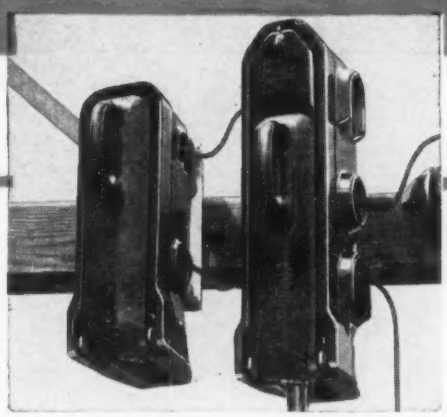
Address.....

* Please include your company's name and your position, as we cannot ask manufacturers to furnish literature unless you do.

Here's one way to protect branch line service....with LM Reclosing Fuse Cutouts

Main Line

Branch Line



First shot of recloser has 30-amp. fuse link; second shot a 50-amp. link. First link blows before the 40-amp. links in single-shot cutouts on either of the two laterals A and B, thus continuing service to both laterals in case of a temporary fault on either.

RP-515 Reclosing Fuse Cutout Unit

Rating: 5000 Volts △ 100 amps.

RP-515, shown at right, is a conversion unit, complete with hydraulic time-delay mechanism. Makes a recloser of any one-shot cutout now on your lines. Adding two 515's makes a three-shot recloser. Cartridge drops to indicating position; door stays closed. Quickly re-fused. Impossible to have two fuses in parallel.

A method successfully used by certain operating companies combines reclosing and single-shot fuse cutouts, as shown in the diagram, thus extending the protection of the recloser to the laterals on lines where fault currents are small. If a temporary fault of 300 amperes or less occurs on lateral A, 30-amp. link No. 1 of the recloser blows first. If the fault is permanent, 40-amp. link in cutout A will also blow. But service to lateral B continues. Only should an additional fault occur between cutout B and the recloser will the second, 50-amp. link of the recloser blow. Link sizes must, of course, be coordinated on the basis of possible fault currents. A coordination table is available on request.

ASK THE L-M FIELD ENGINEER

Here's a man who can help you with suggestions for improving your line protection. Ask him when he calls on you.

A

Single shot "PVD" cutout; 40-amp. link—will blow only if fault continues after first link of recloser has blown.

Laterals

B

L-M "PVD" Single-Shot Indicating Fuse Cutout

4 Sizes: 5000 V. △; 50 and 100 amps. 7500/12,500 V. Gr. Y; 50 and 100 amps.

When link blows, door stays closed; cartridge drops to indicating position, easily seen from ground. Re-fused in 60 seconds on the pole, with gloved hands; or in 6 seconds by unhooking door and hooking on a spare, fused door.

GET THIS BOOKLET

Booklet 44-101 describes L-M Fuse Cutouts and their application. You'll find it helpful. For your copy, write Line Material Company, Milwaukee 1, Wis.

LINE MATERIAL
FUSE CUTOUTS & FUSE LINKS

L-M DISTRIBUTION EQUIPMENT INCLUDES: Distribution Transformers • Fuse Cutouts and Fuse Links • Lightning Arresters • Oil Switches • Pole Line Hardware • Line Construction Specialties • Underground Equipment • Fibre Conduit • Street Lighting Equipment

This is the Mark of Quality

All stock types of TIREX cords and cables have the name "Simplex-TIREX", together with the type and the voltage, molded into them. This mold positively identifies all TIREX cords and cables as the genuine article.

It's a safety feature from your point of view because it insures that you get exactly what you are ordering and, in addition, it prevents any question as to whether or not it is one size or the other. In other words, it is a positive index as to the size, number of conductors and the type. If the name "TIREX" is there it's your assurance that you are getting genuine Selenium Rubber Armored TIREX.

The next time you need portable cords or cables be sure you specify TIREX and then be sure you get it by insisting that the cord or cable you get is marked "Simplex-TIREX".

TIREX SELENIUM Rubber Armor Unequalled for Long-Life-Toughness and Resistance to Abrasion.

Simplex Wire & Cable Co., 79 Sidney Street, Cambridge 39, Mass.

ARMY E NAVY M

Simplex WIRES and CABLES

2-WAY FM RADIO

makes utility maintenance more effective

In fair weather or foul, on any location throughout your circuit mileage, a maintenance truck is never alone when equipped with a G-E 2-way FM radio. It provides each crew with the means for reporting existing conditions back to the dispatcher, for getting help fast, for communicating with other crews on the same job, and for getting new assignments. Two-way radio can bring your maintenance facilities under finger-tip control.

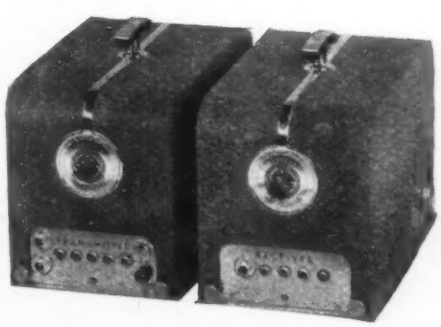
A G-E 2-way FM radio system will give you reliable, long-range communication under the most adverse conditions, day and night. It will enable maintenance crews to serve wider areas in less time and at lower cost. It will help improve your service.

In serving your radio-communication needs, G. E. offers you the same specialized attention that is extended to you in your power-distribution and maintenance requirements. Call your G-E sales engineer. He will have a specialist assist in planning the most effective system for your installation.

Electronics Department,
General Electric Company,
Schenectady 5, N. Y.

Write for these booklets: "G-E FM Communication System Guide" gives you practical facts about the selection of 2-way FM radio and will assist you in estimating total installation costs. "G-E FM Communication Equipment Catalog" describes and illustrates the required units and accessories.

Government regulations now permit new installations of 2-way FM radio for important requirements of utility companies. Let your G-E representative help you prepare your applications.

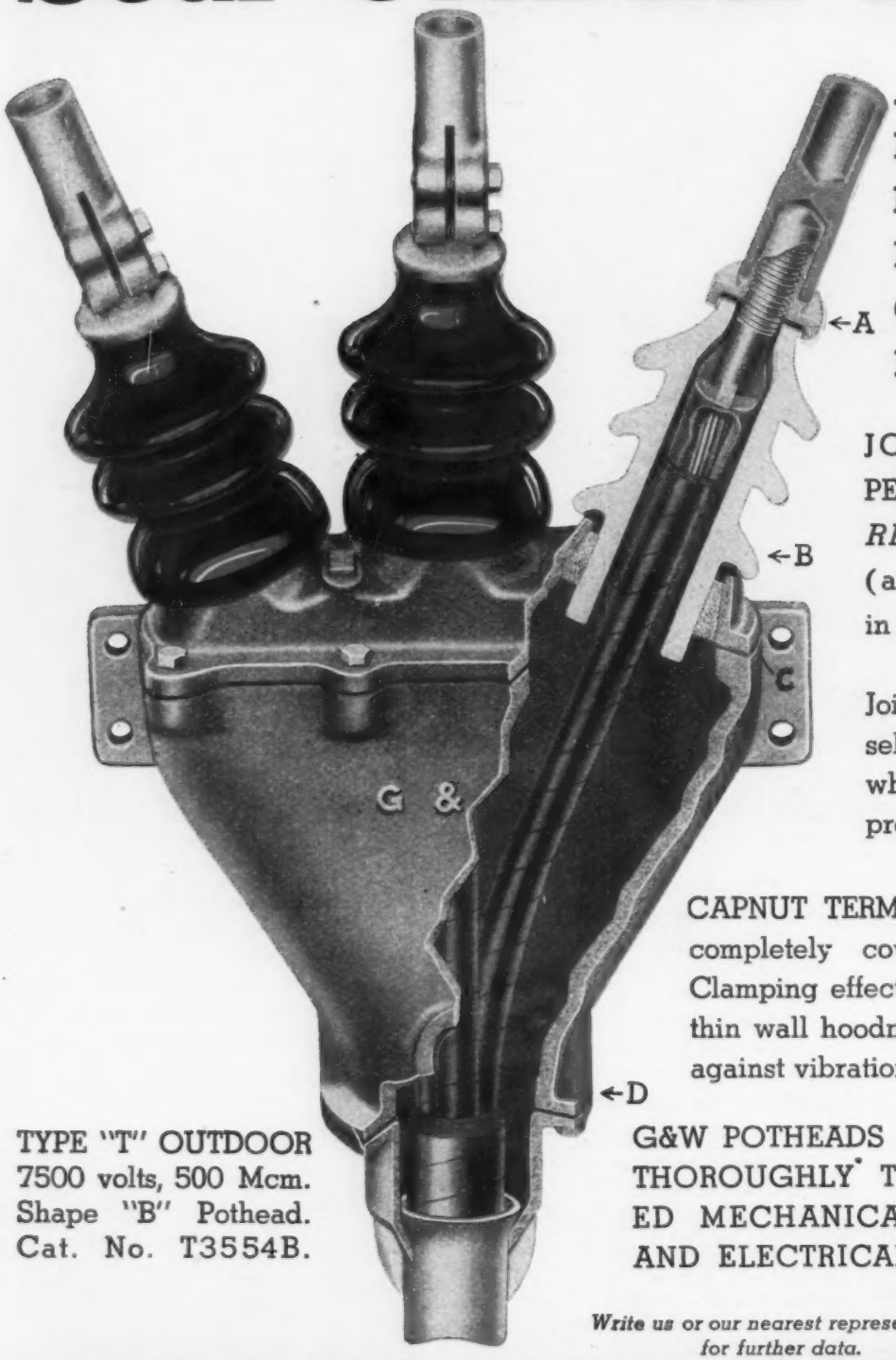


Everything for 2-way radio communication

GENERAL ELECTRIC

163-DB-6918

G&W POTHEADS *Seal* CABLE ENDS



. . . AGAINST ENTRANCE OF MOISTURE AND LEAKAGE OF CABLE IMPREGNATING OIL.

JOINTS A-B-C-D ARE PERMANENTLY SEALED BY *RESISTOYL* GASKETS, (a material first developed in 1932.)

Joint (B) is sealed by the self retaining shaped gasket which is held under compression by the *cement*.

CAPNUT TERMINAL . . . Closed hoodnut completely covers connector threads. Clamping effect of aerial lug through the thin wall hoodnut locks the top assembly against vibration.

TYPE "T" OUTDOOR
7500 volts, 500 Mcm.
Shape "B" Pothead.
Cat. No. T3554B.

G&W POTHEADS ARE THOROUGHLY TESTED MECHANICALLY AND ELECTRICALLY.

Write us or our nearest representative for further data.

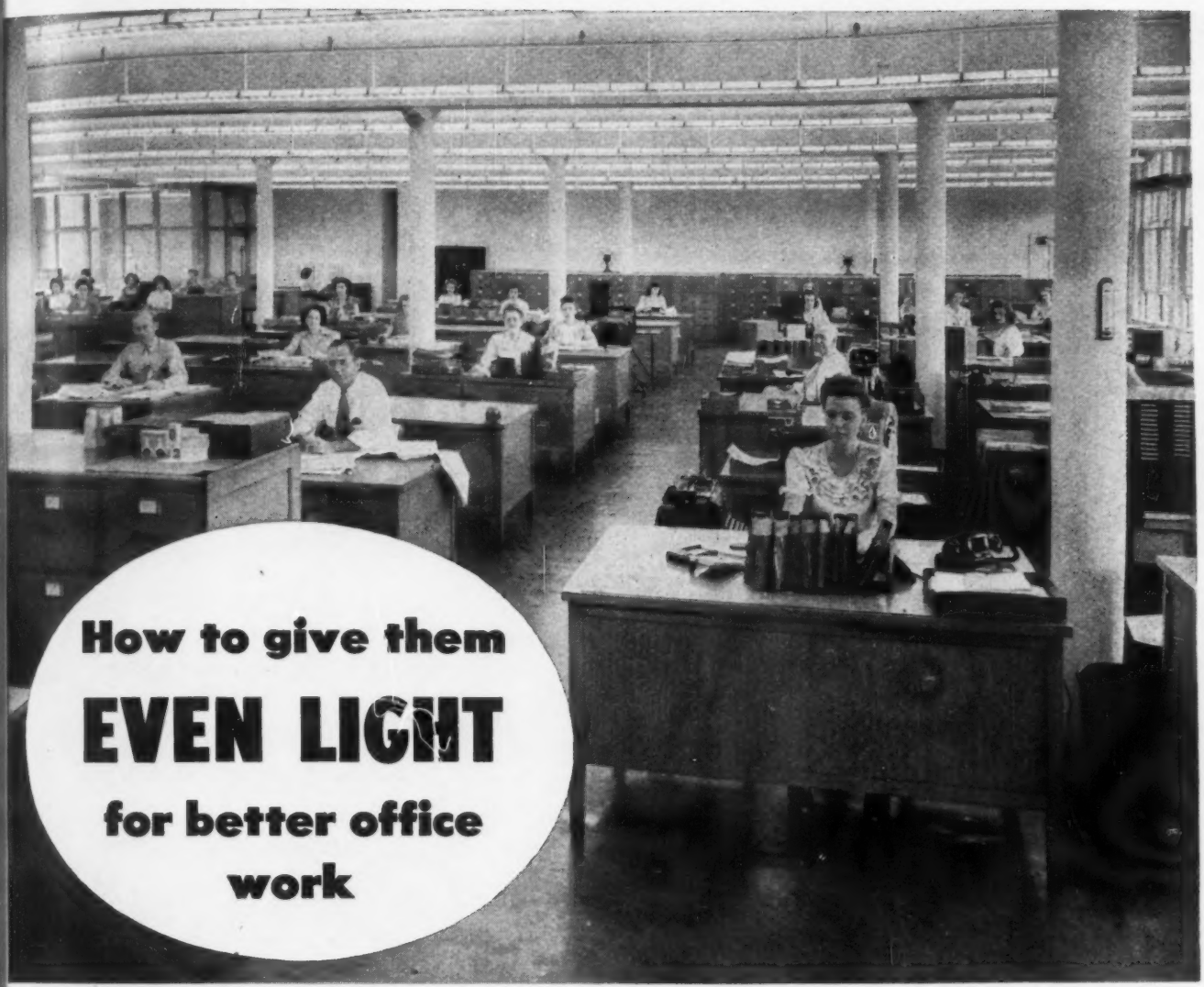
G&W ELECTRIC SPECIALTIES

Originators and pioneers of equipment for sound methods of underground and overhead electric distribution

G&W ELECTRIC SPECIALTY CO.
7780 DANTE AVE., CHICAGO 19, ILL., U.S.A.

Potheads . . . Boxes . . . Oil Fuse Cutouts . . . Oil Switches . . . Multitaps . . . Splicing Kits

Western Representatives in Denver, El Paso, Salt Lake City, Los Angeles, San Francisco and Seattle



Wanted: Good lighting distribution throughout the clerical section of the Warner Chemical Company. Bothered by "spottiness" and low levels of light, they asked for help in improving lighting conditions.

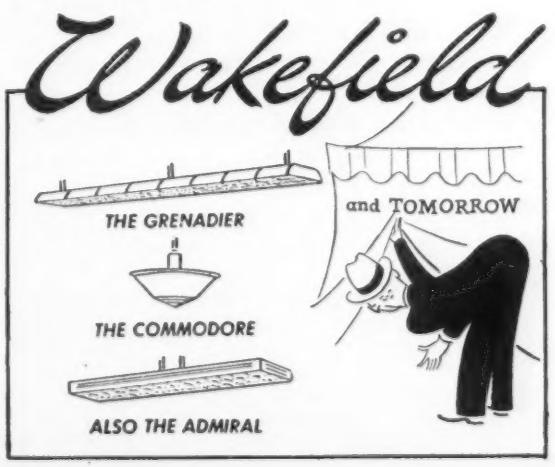
Problem: To secure as uniform distribution of light as possible with the use of present outlets. And also to help create a good-looking, modern office for greater efficiency.

Solution: Wakefield GRENADIERS No. PG2488 in continuous rows placed 7 feet apart did the trick. Their streamlined functional design puts plenty of light down on desks, and their translucent plastic sides provide light on walls and ceilings for greater eye comfort and better working conditions. The fact that GRENADIERS provide a wireway for feed wires made it easy to utilize present outlets with a minimum of change. Incidentally, the ease of hanging GRENADIERS greatly speeded the installation. Lighting level after 1000 hours operation: 35-40 footcandles.

Your customers' lighting problems may be different, but you can be sure of this . . . Wakefield will gladly work with you to help provide the lighting results that you and your customers want. The F. W. Wakefield Brass Co., Vermilion, Ohio.

Are your customers throwing away DOLLARS?

Proper lighting maintenance—cleaning fixtures and walls and relamping—can double or triple their light. Urge them to get the lighting value they pay for. It's important to you!



PLASTILITE

No. 17

He never had a pin-it-up* like this back in those army barracks. But he and his family are eagerly looking forward to *this* kind of picture to add a gracious note of light to the home scene. The new Railley Pin-It-Up* lamps have a glamour all their own. The style pictured here is just one of the many beautiful new models now coming out in gradually increasing quantities. For sales-proof styling, and priced for volume business, Railley Lamps occupy an important place and answer a long-unsatisfied consumer demand.

*Reg. U. S. Pat. Off.

Railley
CORPORATION · CLEVELAND, OHIO
ORIGINATORS OF THE
PIN-IT-UP LAMP

Essex EXTRA-TEST Magnet Wire

IN A HOT SCRAPE

-for your benefit

WIRE SX PRODUCTS

● To spot check the enamel insulating film for toughness, laboratory engineers subject Essex Magnet Wire to the "torture" of *hot scrape tests* regularly.

In these tests the wire is heated for 20 minutes at 220° F.—then pulled between a smooth anvil and a .016" diameter needle. Variable weights can be placed on the needle, enabling the technician to determine whether the enamel film is baked sufficiently hard to stand up under undue winding abuse.

Such tests play an important part in the maintenance of rigid Essex manufacturing standards, and give you further assurance that *Extra-Test* Magnet Wire is the logical choice for finer, trouble-free coil winding.

ESSEX WIRE CORPORATION

FORT WAYNE 6, INDIANA

WE'VE GOT THOSE
"Backlog Blues"
AT SILENT SIOUX
● Nobody regrets more than we do that we cannot possibly fill orders immediately for all the many new dealers seeking the profitable Silent Sioux franchise. All our production for this year has been spoken for . . . and then some. So no wonder we've got those "Backlog Blues".
BUT . . . this is more than a lick and a promise . . . if you write now we'll give you a priority on 1946 production. For Silent Sioux franchises are open in many splendid territories. A complete line of proven fast selling space heaters, air conditioning furnaces, hot water heaters, etc. Act now!
Silent Sioux
SILENT SIOUX OIL BURNER CORP.
ORANGE CITY, IOWA

Peace and rest at length have come

All the day's long toil is past

And each heart is whispering "Home,

Home at last"

THOMAS HOOD

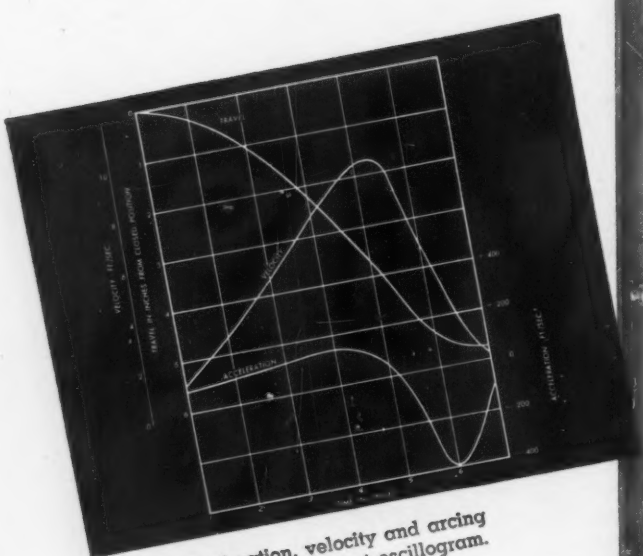
SPANG-CHALFANT

Division of The National Supply Company

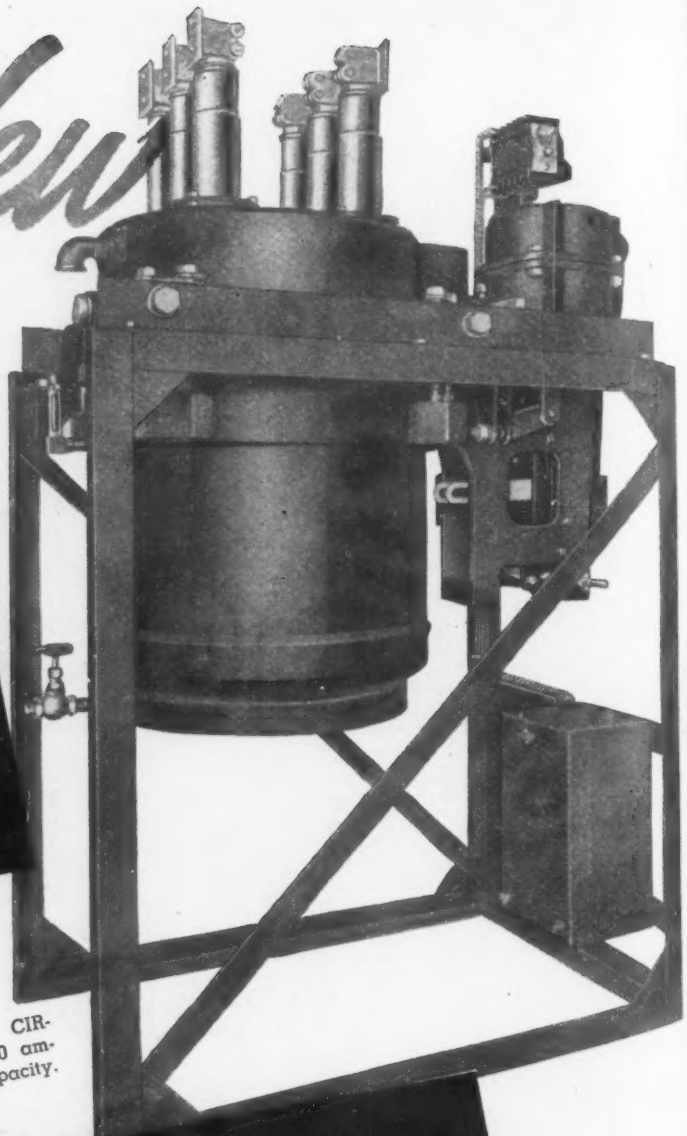
GENERAL SALES OFFICE: GRANT BUILDING, PITTSBURGH 30, PA.

District Offices and Sales Representatives in Principal Cities

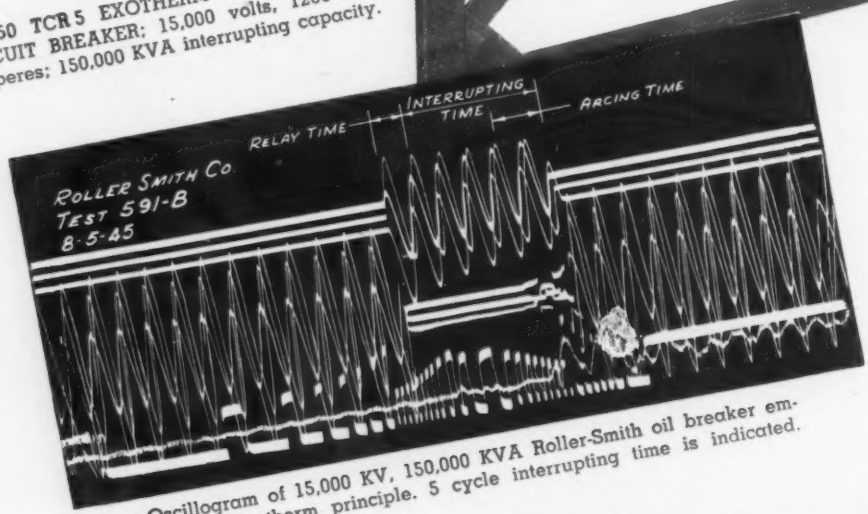
New



Curves of acceleration, velocity and arcing time derived from breaker test oscillogram.



150 TCR 5 EXOTHERM TYPE OIL CIRCUIT BREAKER; 15,000 volts, 1200 amperes; 150,000 KVA interrupting capacity.



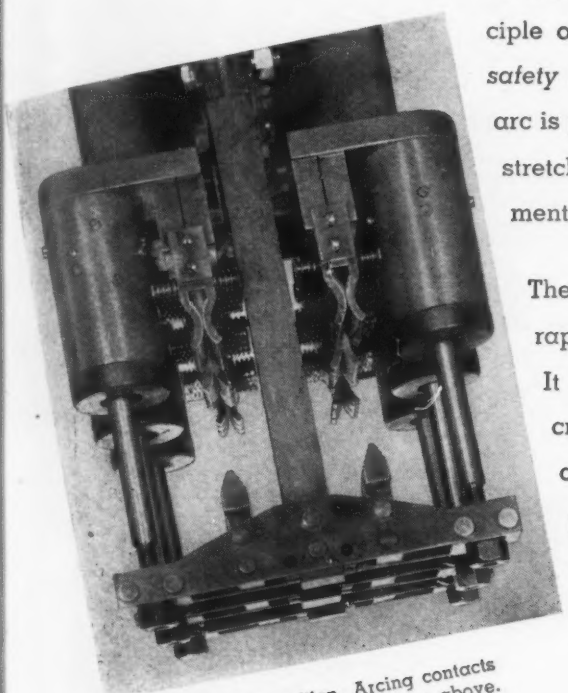
Oscillogram of 15,000 KV, 150,000 KVA Roller-Smith oil breaker employing Exotherm principle. 5 cycle interrupting time is indicated.

ROLLER

ROLLER SMITH

ROLLER-SMITH BREAKER

Gives 5 Cycle Opening with newly discovered EXOTHERM principle of Arc Extinction - - -



Breaker in open position. Arcing contacts shown with quenching chamber above.

THE new Roller-Smith oil circuit breakers with the Exotherm principle of arc extinction give 5 cycle opening consistently, *a 38% safety factor over present accepted standards.* That's because the arc is put out by use of its gas generated energy instead of merely stretching the arc. Users are assured greater protection to equipment by this higher opening speed.

The operation of a confining chamber to quench the arc rapidly is based on the known properties of gas conductivity. It decreases with decrease in gas temperature and also decreases with an increase in pressure. In the quencher the cooling of the arc extracts its energy and reduces the temperature. At the same time the enclosure builds up the gas pressure so that it becomes less conducting and the combination puts out the arc.

The greater speed on opening cuts down contact burning and thereby reduces contact maintenance. It also gives improved protection to equipment against short circuits because of the higher speed of opening.

Confining the gas within the quenching chamber to put out the arc keeps the pressure within the tank at a safe nominal value.

For full information on the Exotherm principle applied to Roller-Smith oil circuit breakers, write to dept. EW-5

SMITH

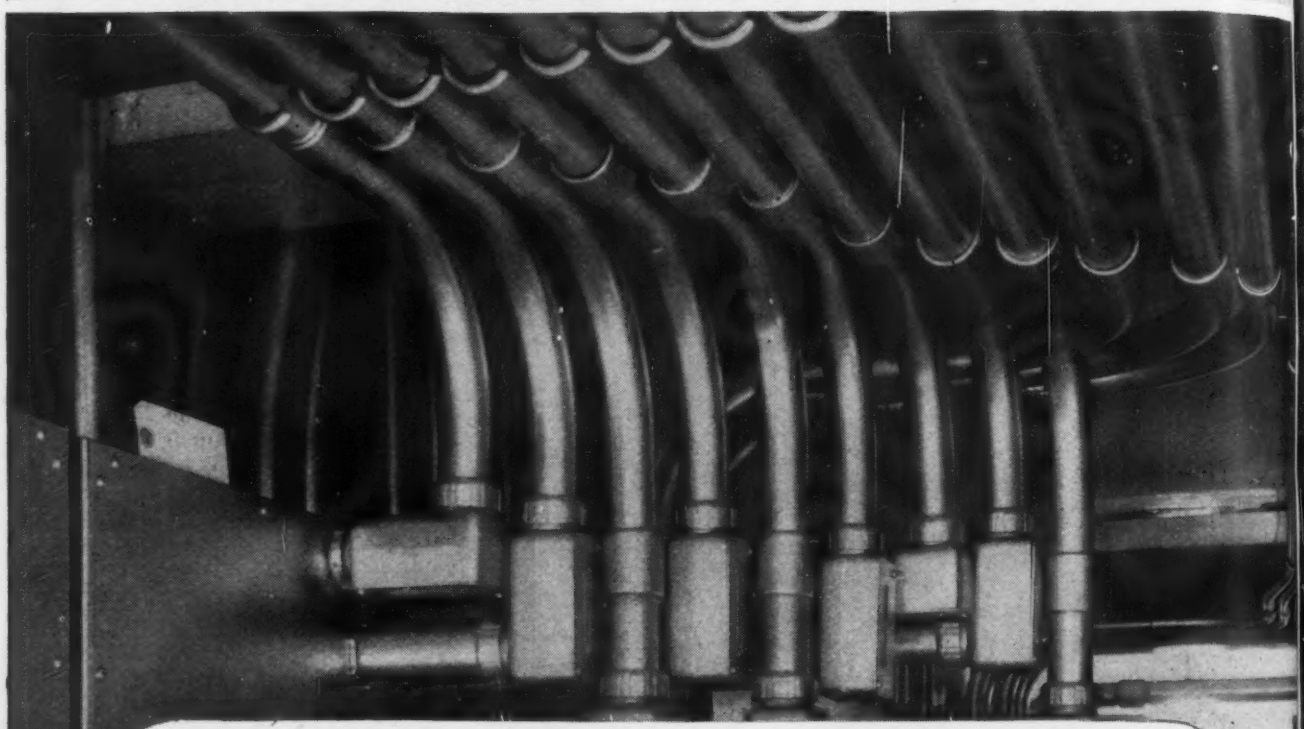
Oil Circuit Breakers

BETHLEHEM • PENNSYLVANIA

In Canada: Roller-Smith Marsland, Ltd., Kitchener, Ontario

STANDARD AND PRECISION ELECTRICAL INSTRUMENTS • AIRCRAFT INSTRUMENTS • SWITCHGEAR
AIR AND OIL CIRCUIT BREAKERS • ROTARY SWITCHES • RELAYS • PRECISION BALANCES

FOR SAFETY'S SAKE . . . USE CONDUIT *(Full Weight Rigid Steel)*



Smart Long-term Planning Demands SAFE Wiring Methods

A double responsibility confronts the electrical industry:

1. The obligation to replace temporary, unsafe wiring systems, installed according to "must do" emergency ideas, forced on industry by shortages and regulations.
2. The duty to install only assuredly safe wiring systems in all new construction.

Remember this: The only wiring system approved by the National Electrical Code as moisture, vapor, dust and explosion proof in hazardous locations is a standard-threaded rigid conduit.

With standard-threaded rigid steel conduit, such as Youngstown's Buckeye, again available through distributors, there is no reason not to provide dependable wiring protection.

Wherever there is moisture, or vapor, or excessive vibration, or possibility of corrosion, or accumulating dust and dirt, or danger of crushing or other mechanical injury, specify and use Youngstown Buckeye Conduit.

YOUNGSTOWN
THE YOUNGSTOWN SHEET AND TUBE COMPANY
YOUNGSTOWN, OHIO
Manufacturers of
CARBON - ALLOY AND YOLOY STEELS

Ask your distributor for:
Youngstown Buckeye Conduit - Pipe and Tubular Products - Sheets - Plates - Electrolytic Tin Plate - Coke Tin Plate - Bars - Rods - Wire - Nails - Tie Plates and Spikes.

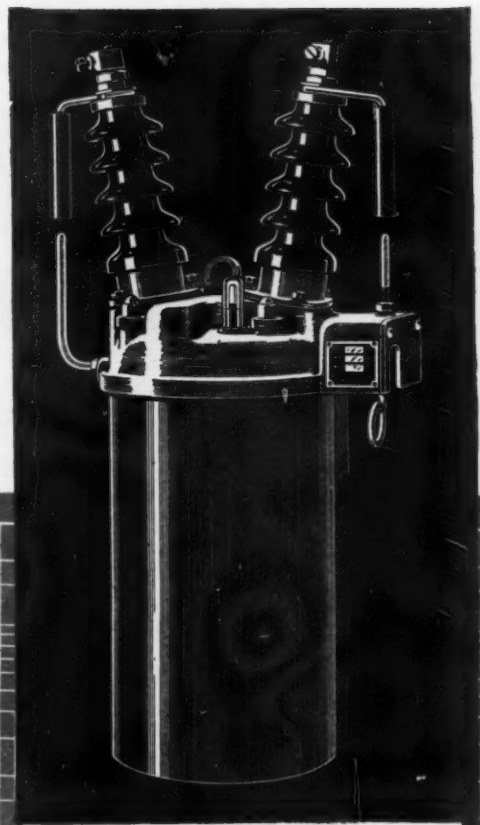
Type "H" KYLE Oil Circuit Reclosers AUTOMATICALLY keep MORE Lines in Service MORE of the time

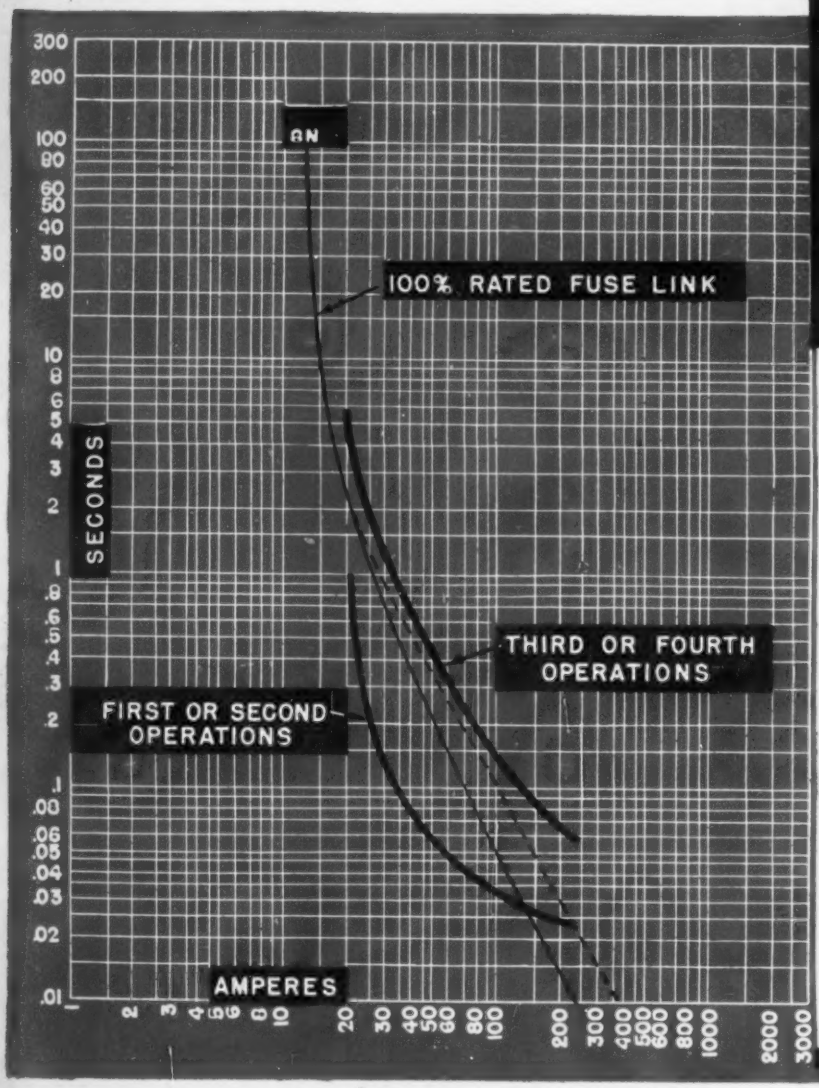
Use of Type "H" Kyle Automatic Oil Circuit Reclosers at strategic points gives greatest possible continuity of service.

Dual operating characteristics of Kyle Reclosers automatically act to protect the fuse links on all short-duration, temporary faults . . . save countless service trips. It is the result of the exclusive Kyle trouble-free hydraulic mechanism which gives:

1. **Fast Opening** on first and second operations . . . acts before the fuse can blow . . . automatically restores full service if the temporary fault is quickly cleared.

2. **Time Delay Opening** on third and fourth operations . . . permits the fuse to blow . . . isolates the short section of line that it protects.





How a 10 Ampere Kyle Recloser Coordinates With 8 Ampere L. M. Fuse

This time current curve illustrates the action of a Type "H" Kyle Oil Circuit Recloser of 10 ampere rating when coordinated with an 8 ampere L. M. fuse link.

Melting time for the fuse link is indicated by the solid line. The dotted line shows the clearing time or total time required for the fuse link to blow.

The first or second (fast) operating curve of the Kyle Recloser lies below the melting time curve of the fuse link, allows temporary faults to be cleared without damaging the fuse link.

To assure blowing of the fuse before the Kyle Recloser locks out, the clearing time curve of the fuse lies below the third or fourth (time delay) operating curve of the Recloser. Thus, the time for the fuse to blow is less than the operating time of the Recloser on these time delayed operations and proper coordination is assured.

Selective service operation as shown on this drawing is assured on all values of fault current up to 100 amperes.

Ask your Line Material representative for full information on Type "H" Kyle Automatic Oil Circuit Reclosers. He will be glad to supply time current charts and technical data on how Kyle Reclosers can be used to best advantage on your lines.

MADE BY KYLE CORPORATION SOUTH MILWAUKEE WISCONSIN

KYLE Circuit Breakers are Designed and Manufactured for LINE MATERIAL COMPANY MILWAUKEE WISCONSIN

ELECTRA'S HUSBAND

The Boss Writes a Letter

HIS men, through the bargaining representative, had given notice that tomorrow morning they were to go on strike for 30% more wages. The manager sat alone in his office a long time thinking about it. Since this labor business he had been kept out of touch with his boys and he didn't like it. He probably could have reasoned it out with them, as he did in the old days, man to man, but the law wouldn't let him do that any more. Now he had to fight it out with a stranger, a bargaining representative, somebody who didn't know the first thing about his business but who would throw his weight around and toss figures at him of which he didn't know the meaning. Common sense and good judgment wouldn't count. It was going to be like a law suit, all bound up in lingo he couldn't understand and did not like.

As he sat there thinking about it, he wondered why he hung on to his business anyway. The fun was all gone out of it. Between one thing and another, taxes, troubles, materials and wages, he wasn't getting either the kick or the income out of it that would pay him for his headaches.

So he decided to write all his employees a letter. And this is what he wrote:

"Boys—I hear through that mouthpiece of yours that you're going to strike on me, demanding more pay. Well, boys, so am I. I'm going to strike too for more pay. I've got as much right and a damn sight more reason to strike than you boys have. Just woke up to the way I've been kicked around lately and I won't stand for it any longer. I'm on strike.

"Here are my demands. This is my beef. I think that's the way it's done, isn't it?

"I want more pay for what I do. The beating I take running this business is worth more than I'm getting out of it and I'll be damned if I burn up my life making jobs for you boys if I'm only to get my pay chiseled down again.

"What do I do? If you boys had sense you'd see *I'm* your agent, not this bozo you've selected to bargain for you. What do I do but bargain for you guys? I had to scrape up the money to start this outfit. That took plenty of bargaining, believe me. I had to go without much more than subsistence pay myself until I could get it started so I could hire anybody. My pay then came mostly in satisfaction of bucking the competition and getting the business on its feet. I worked long and late at it. No overtime pay either, remember. Then I bargained to get materials for you to work on.

"So I was your business agent and still am. I bring in the business so that you can have jobs. Without me bargaining with our customers, there'd be no orders. Without orders there'd be no job opportunity for you. Jobs just don't grow on trees. I bargain for them for you boys. Then if you all produce the product reasonably, I get my pay just as you get yours, out of what our customers pay us.

"So if you guys are going to get a raise, I've either got to get it from our customers or it will come out of me and that means a cut in my pay. I'll be damned if you're going to cut my pay. Get yourself another agent—that smarty that has talked you into this. Let's see *him* go out and really get you the business and thus make jobs for you. All of his thinking has been in reverse—slowdown, more men on an operation than it justifies, stuff like that. Try that on our customers and see how they like it. I've had to be the bumper for that guff myself.

"Another reason I'm striking is that I don't think there's a chance to get more for our product out of our customers than we've been getting. If OPA doesn't keep us to our ceiling, the public sure will. They'll do it by not buying. Boys, that kind of a strike hurts you and me more than the OPA.

"I don't think there's a chance to persuade you or that agent of yours of this. So I'm going on strike. You boys could always forget the business when the whistle blew at 4:30. But I carried it home with me nights and Sundays. Even that golf game you boys envied me was to get business and make us both a job. There used to be pay for me, both in the return I got on the money I had to scrape up and to protect by careful management, and in the kick I got out of doing a growing business. I used to get a kick too out of seeing some of you boys show you had stuff so that I could raise you and give you more responsibility.

"Lately that pay has been all taken away from me. I just don't have much to say about the business any more. It's all fenced in with a lot of regulations and everybody and his brother wants a cut on it—the income tax, the state tax, local taxes, various government agencies, licenses. I've had to put on so much office help to handle just reports and forms, there's hardly time to go out after more orders.

"So you see, boys, I'm doing more work than I ever did before and my pay has been cut both in income and in satisfaction. And I'm walking out.

"Sorry this is a printed letter, boys, but I wouldn't ask any of the girls to cross the picket lines, and I won't either. So I had it done out. Hate to think of you fellows out there cold on the picket line. I suppose I ought to be there with you, on my own strike. Maybe I will. Don't be surprised if you see me. For I'm definitely on strike. Good luck, boys, on your beef. Wish me luck on mine.—The Boss."

ELECTRA is wondering when the public is going to revolt against a continuation of a lot of wartime inconveniences, disrespect and discourtesies. There isn't much reason any more for the wartime excuse with which every breach of normal service was alibied—"It's the war." The other night when Electra complained about a particularly trying day during which she had been insulted, ignored and generally abused. I showed her a little card which the San Jose Merchants Assn. has prepared for distribution to its membership and their employees. It is entitled *Who Am I?* and here is what it says:

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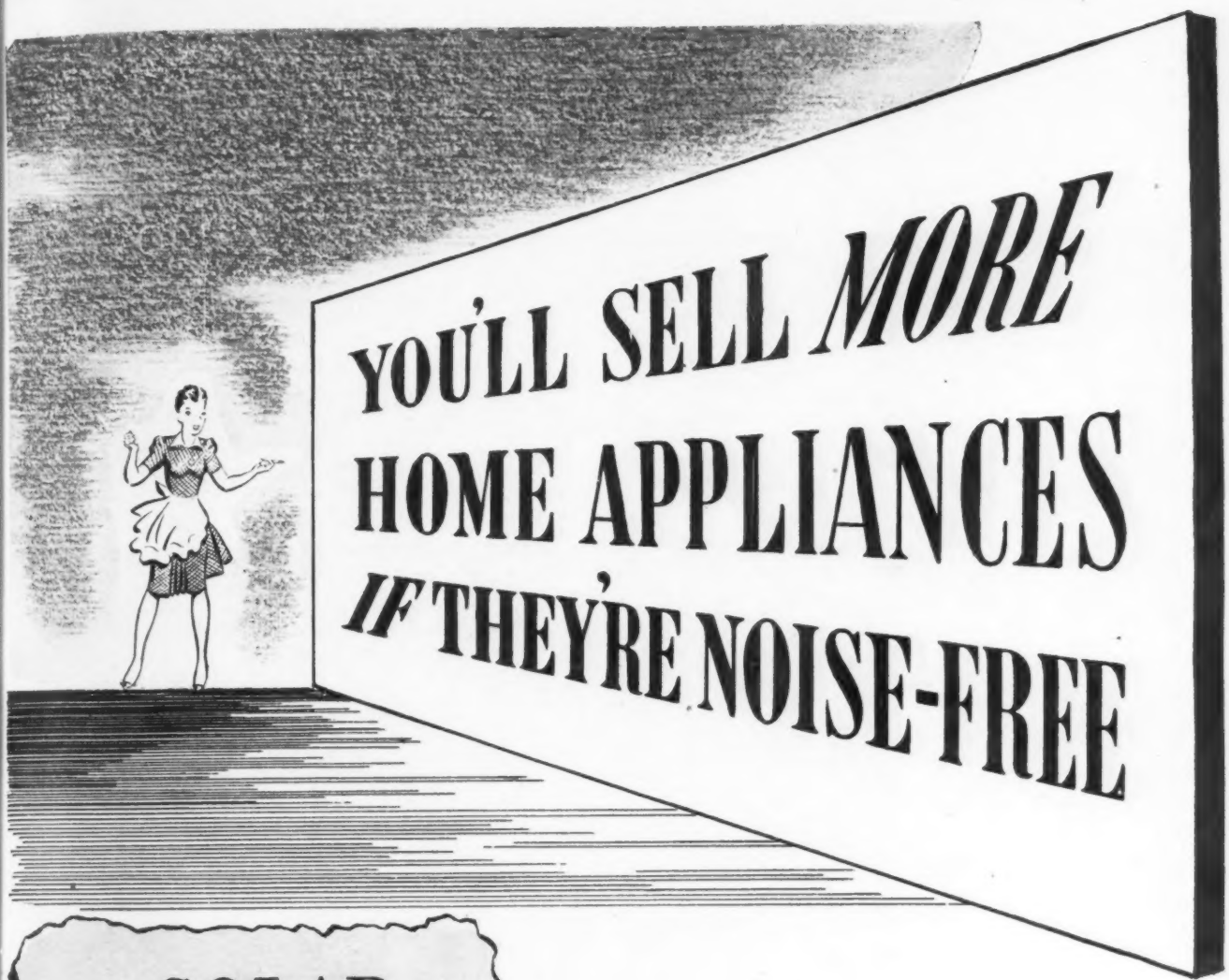
"I create friendships and goodwill. I inspire respect and admiration.

"Everybody loves me . . . I bore nobody . . . I violate no laws . . . I cost nothing.

"Many have praised me, none have condemned me. I am pleasing to everyone.

"I am useful every part of the day.

"I am *courtesy*."



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ELECTRICAL WEST

DECEMBER, 1945
VOL. 95 NO. 6

ELECTRIC TRANSPORTATION— A BIG LOAD BUILDER

John A. Miller
Transportation Consultant

THE role electric transportation promises to play in postwar city planning is one of the most important in the entire picture of transit modernization. The list of cities where improvements in electric transit facilities are under consideration today reads like a census of the major population centers of the United States. Included on the list are New York, Chicago, Philadelphia, Detroit, Cleveland, Boston, San Francisco, St. Louis, Atlanta, Providence, Kansas City, Indianapolis, Dallas, Washington, Memphis, to mention only a few. In some of these cities new rapid transit facilities are planned; in others, modernization of the street railway lines is proposed, while in the largest number, the extensive use of electric trolley coaches is contemplated.

This rebirth of interest in electric transportation is part of a general renewal of interest in public transportation service stemming from the war. Such traffic counts as are available indicate a wartime reduction of about 35% in the number of persons carried by private automobiles in urban areas. In contrast to this reduction in the use of private automobiles, the use of public transportation facilities—rapid transit lines, street cars, electric trolley coaches and motor buses—increased about 75%.

Most city planners are convinced that the popular dream of universal postwar construction of superhighways and use of private automobiles in place of public transportation service is only a dream. These planners recall the intolerable traffic congestion created by the widespread use of private automobiles before the war. They know the huge cost of providing greatly increased facilities for the use of private automobiles. They are familiar with the remarkable record made by public transportation service during the war. As a result, they are disposed to give public transportation a prominent place in postwar city planning.

Trackless trolleys return to assembly line. Some are earmarked for Seattle

Indicative of this trend is the recent report of the Metropolitan Transit Commission of the Massachusetts legislature which goes so far as to say that superhighways "are not even an important factor" in planning to meet the transportation needs of the greater Boston area. This report points out that improved electric transit facilities accommodating two million passengers a day could be developed for the same cost as one superhighway through the city of Boston.

Detroit's transportation committee has reported in favor of the construction of a number of superhighways, but it has suggested that electric railway tracks be placed in a reserved strip in the roadways of a number of them. Several new electric trolley coach lines are also recommended.

At Baltimore, the business men's Downtown Committee says that "public transit brings many more people into the central area per vehicle than does any other form of transportation and, therefore, offers a minimum of traffic congestion for the number of people transported."

This very ability of public transit service to transport large numbers of people in a relatively small number of vehicles tends to create a misconception of the importance of public transportation. Few people realize that the bulk of the local travel in large cities always has been, and still is done by public vehicles. In New York, for example, approximately eight out of ten people use public transit vehicles in their daily comings and goings. Even in Detroit, the automotive capital of the world, a count made just before the war showed seven out of ten people in the downtown area to be transit riders.

Figures compiled by the American Transit Assn. show that electric transit lines are the most important element of public transportation service in urban areas. Last year they carried a total of 13 billion passengers as compared with 8½ billion carried by motor buses. There was a total of 118 electric railway and electric trolley coach companies serving these areas as compared with 379 motor bus companies. It is significant, however, that two thirds of the bus companies were in cities of less than 50,000 population.

Subways and elevated railways came first in density of traffic. They carried nearly 7,000,000 passengers per mile of line in 1944. Street cars were second with about 1,500,000 passengers per mile of line. Trolley coaches handled traffic of density approaching that of the street cars, or 1,060,000 passengers per mile of line. In comparison, the riding on motor buses was relatively

Latest type of PCC car has standee windows and electric braking. More than 1,000 have been ordered this year

First air conditioned trackless trolley built for city use. Air conditioning equipment weighs about 1,500 pounds

light, being only 200,000 passengers per mile of line.

Street cars were the biggest earners with 59.4 cents of revenue for every vehicle mile operated. Trolley coaches were a close second with 51.2 cents. Motor buses, as might be expected from the lighter character of the traffic they handled, earned only 34.4 cents per vehicle mile. The average fare paid per passenger was lowest on the street cars, being only 5.4 cents. Trolley coach fares were slightly higher at 5.5 cents. Motor bus fares in city service averaged 5.8 cents.

All of these forms of public transportation showed substantial increases until the end of the war, but the most outstanding gains were made by the electric transportation services, with trolley coach at the head of the list. What made these increases particularly remarkable was that they were accomplished with practically the same number of vehicles that the transportation system was operating before the war, the War Production Board having authorized the construction of very little new electrically propelled equipment. Large increases in traffic were recorded by the motor bus lines, but they were permitted to make substantial additions to their fleets of vehicles and their gains were therefore less impressive.

Looking to the future, the city of New York has laid out a billion-dollar, six-year transit modernization program. Most of this money is slated to go for new subway construction and extensions to existing rapid transit lines.

Of special interest is the postwar transit improvement program proposed for the Boston area by the special commission of the Massachusetts legislature. This contemplates the extension of the present rapid transit system by conversion of some 70 miles of steam railroad track to electric operation and the establishment of connections at or near the ends of the present subway and elevated lines. A total of more than 400 new cars will be needed for the proposed operation. Many new electric trolley coaches will also be reqired to provide feeder service to the rapid transit extensions. This rapid transit plan is in addition to the modernization program for the present Boston Elevated Railway system, which has recently purchased 100 new PCC cars for surface operation and a large number of trolley coaches for operation in outlying sections.

Outstanding among the plans for modernization of surface lines is that proposed for San Francisco. It includes substitution of trolley coaches or motor buses for street cars on a number of routes and new PCC cars for virtually all of the rail lines that are to be retained. Altogether the program calls for 313 new PCC cars, 223 electric trolley coaches and 215 motor buses.

In all, the transit industry in the United States placed orders for a total of nearly 800 new PCC cars during the first six months of the present year. Modernization programs already mapped out, but not at the stage of placing actual orders, will bring the number to many hundreds more, making a total far in excess of the number ordered in any year for a long while.

Several years ago Seattle undertook a far-reaching transit modernization program with electric trolley coaches as the backbone of its system. (Ed Note: It has been calculated that the Seattle transit system's 307 trolley coaches build load equivalent to 13,837 refrigerators, 7,380 ranges or 213,097 washers. Operating organization last year paid $858,061 for electric power.) This example will be followed by a considerable number of other cities as soon as the necessary equipment can be secured. Providence is contemplating such a move. So are Des Moines and Milwaukee. Atlanta has a somewhat similar program. Dallas is modernizing its electric rail lines and establishing new trolley coach lines. Akron, Youngstown, Indianapolis, Memphis and many other cities are enlarging their trolley coach operations. Oklahoma City is joining the list of trackless trolley cities. In some of the cities where trolley coaches are being installed they are being substituted for street cars while in others they are taking the place of motor buses.

The success that has attended the establishment of many new trolley coach systems in recent years is the underlying reason for the present upsurge of interest in this type of transportation. The quiet, rapid operation of the electric trolley coach, together with its ability to pick up and discharge passengers at the curb, appeal strongly to the riding public. Polls taken among transit riders in a number of cities have indicated that the electric trolley coach is the most popular of all types of transit vehicles.

From an economic standpoint, it is significant that trolley coaches carry more passengers in proportion to the investment in plant and equipment than does any other form of transit service. On the average the trolley coaches last year transported 18.5 passengers for every dollar of investment. Motor buses carried 16.8, street cars 6.0, and subway-elevated lines only 1.3 passengers per dollar of investment.

California has the distinction of having had the first commercial trolley coach line in the United States. In 1911, a short "trackless trolley" line was established near Los Angeles by the Laurel Canyon Utilities Co. Its two vehicles were converted gasoline buses to which electric motors and trolley poles had been added. Despite the steep grades encountered, these

converted vehicles performed quite well. A little later a similar experiment was tried at Merril, Wis. Neither of these installations was permanent, both being replaced eventually by improved gasoline buses.

Interest in the trackless trolley was revived in the 1920's, systems being established on Staten Island, and at Baltimore, Rochester, Philadelphia. By 1925, however, most of these systems had been abandoned, and the urban transportation industry in the United States was just about ready to bury the trackless trolley as a dead issue.

This was not because the basic idea of the trackless trolley was unsound. Electric power obtained from a central generating station of almost unlimited capacity was recognized to have many advantages, and the absence of rails was advantageous in many respects, too, but the vehicles were too crude and clumsy to have any popular appeal.

That the idea was not wholly dead, however, was shown in 1928, when the Utah Light & Traction Co. of Salt Lake City adopted trackless trolleys for one of the principal routes in that city. In contrast to the makeshift character of the vehicles used in previous trackless trolley installations, those used at Salt Lake City were carefully engineered for the specific purpose. Their success was immediate. Because they were so different from the previous types of trackless trolley, they soon acquired the name of trolley coach. Following their success there, this type of vehicle was widely adopted for use in other cities throughout the United States, and has been gaining steadily in popularity.

Notable improvements have recently been made in the design of electric transportation vehicles. The outstanding features of rubber springing and high acceleration that characterized the original PCC cars have been retained, while all-electric braking and standee windows have been added. Better ventilation has also been arranged.

With the growing use of air conditioning in railroad cars and intercity buses the desirability of air conditioning city transportation vehicles has been widely recognized. Until recently, however, the size and weight of the equipment required have prevented the adoption of the idea.

A city transit vehicle is standing still with its doors open for near half the time on each trip. This results in a rapid interchange of inside, conditioned air and outside, non-conditioned air. For that reason the equipment must supply nearly twice as much conditioned air as is required for a vehicle in long-distance service, where stops are relatively infrequent. The size and weight of such equipment have presented serious problems to the designers of vehicles for city service.

As one solution of the problem, the Transit Research Corp., specializing in the design of street cars, has developed a system of evaporation cooling by blowing into the car extremely large quantities of ordinary outside air. This produces a cooling effect through the evaporation of moisture from the bodies of the passengers. Equipment on the first experimental cars is designed to provide a total of 12,000 cfm., or about ten times as much as would be necessary for ordinary ventilation and four times as much as would be required if the air were precooled.

Another solution of the problem is being tried in an experimental trolley coach recently placed in service by the Georgia Power Co. at Atlanta. This is a precooled air system with equipment weighing only 1,500 lb. It has cooling and dehumidifying capacity of 2,200 cfm., or approximately that of the latest type railroad cars. Preliminary indications are that this experiment will be highly successful. While it is not impossible that satisfactory air conditioning can be developed for motor buses in city service, electric transportation vehicles possess a definite advantage on account of the ample supply of electrical energy that is always available from the overhead wires.

All this interest in modernization of electric transportation is of special significance to the power industry because it means a continuation of the transit industry's power load. In 1944, the power consumption of the transit industry in the United States was slightly over seven billion kilowatt-hours. That is not a major part of the country's power consumption, but it is by no means a negligible amount. It is the equivalent of an enormous number of home appliances and a very considerable commercial or industrial load. Moreover, it is an easy load to handle because it is delivered in bulk at comparatively few locations. That a large part of this load is likely to be retained is an important factor when it appears that a surplus of generating capacity may be available.

Seattle's transportation system, modernized a few years ago, includes a fleet of 307 trolley coaches, and more are on order when available. This equipment has proved a load builder

Distribution System Economics

Regulators and shunt capacitors used on lines in light load areas can effect worthwhile economies. Use of two in combination is natural team allowing maximum benefits to be obtained from each

*O B. Falls, Jr.**
General Electric Co.

THE term "distribution system economics" might be defined as the analysis and investigation of the design and operation of a distribution system so that there will result a system involving the minimum investment which will give adequate service to the consumers. Included in this is the implied duty that the engineer has incorporated only those items which can be justified on the basis of their ability to show proper return on the investments which they involve.

Regulators can be considered as a tool to be used in the original design of a line or to be added to a line when conditions require. Used in either way, they can result in marked economies in the building or rebuilding of lines. If considered in the original design, a line may be installed initially with the knowledge that it may not be entirely adequate for expected future loads. When used in this manner, however, the line should be so designed that the future expected load can be carried, with the regulators installed, and still obtain adequate voltage.

Using regulators in this way may result in delaying or completely eliminating the necessity of rebuilding an existing feeder or adding new feeders. For example, a line might be installed initially to take care of only existing load plus a small allowance for future growth. Then if future growth never exceeds this first estimate, the existing line is sufficient and excessive investment in terms of the future load has not been put into the line. If the future load exceeds the first estimate, a regulator, or if necessary two or more regulators in series, can be added.

Consider some general figures to illustrate this thinking. Fig. 1 shows some general conditions which might exist. The letter A shows a simple radial feeder carrying distributed load along its length. It might be either single or three phase at any voltage. It is loaded initially so that a voltage drop of 10% is obtained at the end as shown in B. Ten per cent spread in primary voltage between first and last transformer is probably excessive but may not be considered too much for rural or light density distribution. However, it should not be allowed to exceed this value since it must be remembered that the spread in *customer* voltage will be the primary drop between first and last transformer plus the drop in the distribution transformers and secondary circuits, which may add from 5 to 7% more drop.

If the load increases, the primary drop will increase and one way to correct for this is to use regulators in the line between the first and last transformer. Considering this same feeder, the use of regulators in this manner is illustrated in B, C and D. If the load is doubled, the primary drop becomes 20%, which we will say is excessive. If one regulator with 10% boost range is installed, the voltage conditions can be brought back to the original levels. This is shown in B. Two regulators could be used, however, with somewhat better voltage levels being obtained. If installed as in C, the primary voltage spread is further reduced to about 6.7%, but all variation is below normal and each regulator is boosting only about 6.7%. If these were regulators having 10% boost range, they could be installed as shown in D, producing a higher average voltage along the line,

* From a paper presented before recent meetings of the Pacific Coast Electrical Assn. in Los Angeles and San Francisco. The author is in the G-E central station engineering division at Schenectady.

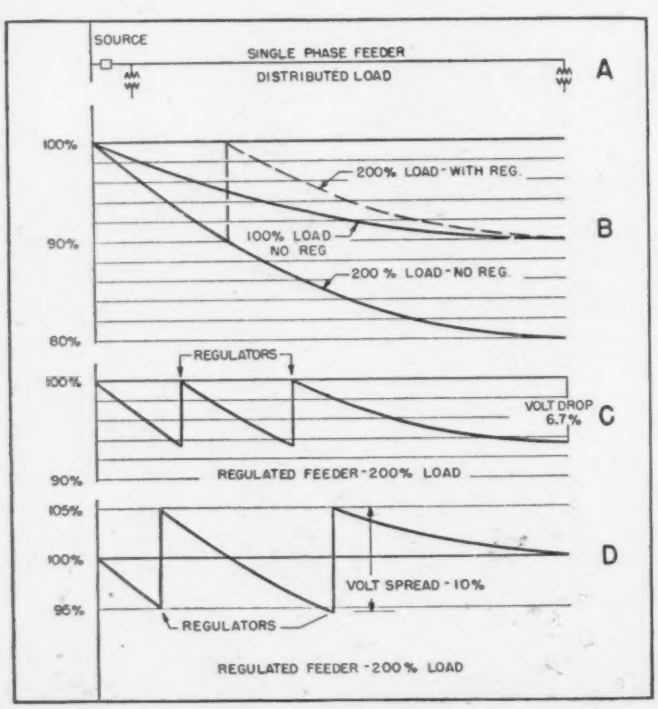
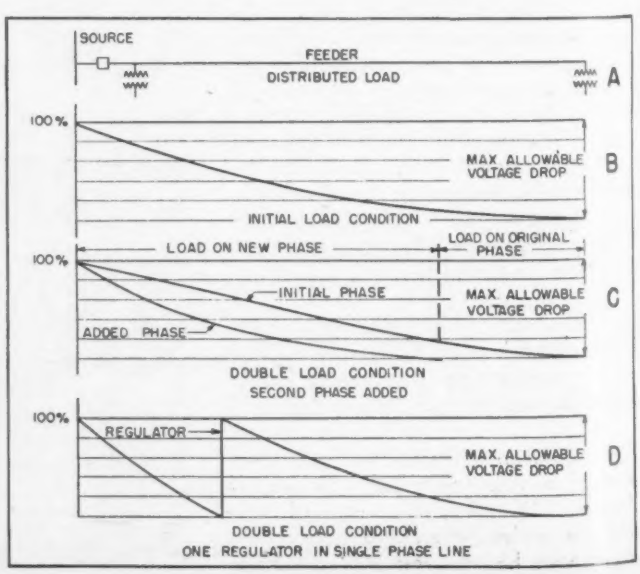


Fig. 1 (left)—A, simple radial feeder. B, C, and D show results of adding regulators. Fig 2 (right)—A, single-phase radial feeder. B, 100% initial load. C, adding another phase. D, regulator gives same general results



but the spread is now 10%, or the same as shown in B with one regulator.

If regulators had not been used, what steps would have been necessary to obtain the same correction? There are several alternatives. If the line was three phase already, either a new feeder could have been erected or larger copper installed. If the line was single phase, another alternative would have been to add the second, and possibly, the third phase. This can be costly, however, as compared to the use of regulators.

Comparative conditions obtained are shown in Fig. 2. Again A indicates a simple radial feeder, in this case considered as single phase. B shows the voltage condition with initial or 100% load. If the load doubles and the second phase is added and all load along its length transferred to it, the second phase must be about 70% of the length of the original phase in order to limit the voltage drop on either phase to the original value shown in B. A regulator could be added, however, as shown in D, with the same general result.

What are the comparative costs? Consider this specific example:

Single-phase line, No. 6 copper, 25 miles long.

Initial load 125 kw. at 0.9 p.f.

Voltage drop about 10%.

Expected load will double or be 250 kw. and 10% drop must not be exceeded.

If line conductors of larger size were installed, this would mean using at least No. 2 copper. This would amount to 33,000 lb. which, at 15c per pound, is about $5,000. This does not include the labor cost of taking down the old and installing the larger conductors, nor does it take into account any change in the cost of poles due to any differences in span lengths.

If another phase of the same size conductor was strung, it would require about 17.5 miles of line to be added, which would cost in the order of $8,000 installed. A regulator having four 2½% steps would accomplish the same result from a voltage standpoint and cost less than $1,200 installed. This would be a 50-amp., 7,200-volt regulator.

In this connection, Fig. 3 shows in a general way how much it costs to carry increased loads for various values of allowable primary voltage drop, if a second phase is added to a single-phase line. The results for various conditions of initial total loads and load densities are shown, and it can be seen that to do the job this way would cost in the order of $5,000 to $15,000. If 10% range regulators are considered, one regulator would be sufficient up to and including the case of 10% voltage drop. For any cases between 10% and 20% two regulators would be required.

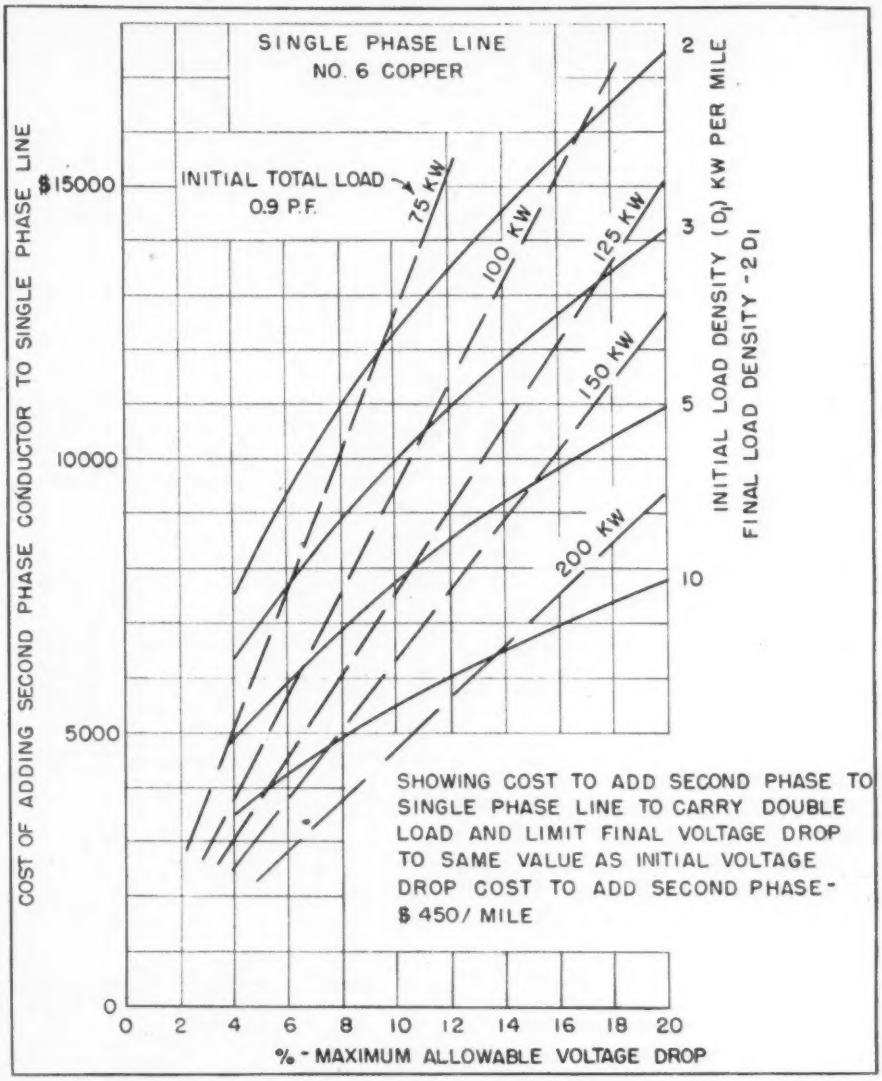

SINGLE PHASE LINE
NO. 6 COPPER
INITIAL TOTAL LOAD
0.9 P.F.
75 KW
100 KW
125 KW
150 KW
200 KW
SHOWING COST TO ADD SECOND PHASE TO SINGLE PHASE LINE TO CARRY DOUBLE LOAD AND LIMIT FINAL VOLTAGE DROP TO SAME VALUE AS INITIAL VOLTAGE DROP COST TO ADD SECOND PHASE - $ 450/ MILE
COST OF ADDING SECOND PHASE CONDUCTOR TO SINGLE PHASE LINE
$15000
10000
5000
0
0 2 4 6 8 10 12 14 16 18 20
% - MAXIMUM ALLOWABLE VOLTAGE DROP
INITIAL LOAD DENSITY (D1) KW PER MILE
FINAL LOAD DENSITY - 2 D1
2
3
5
10

Fig. 3 — Costs to carry increased loads for various values of drop

However, 7,200-volt regulators of the sizes required would cost from $900 to $1,200 each, and even for those cases where two are required, the savings are obvious.

The above analyses were based on single-phase lines, but the principles involved are sufficiently general to make them applicable also to three-phase circuits.

It would be well to point out here, before leaving this subject, that there are at least two factors which may affect any final conclusions for specific cases. First, if energy is purchased, the higher losses occasioned by carrying the heavier loads on smaller conductors might be enough to warrant serious consideration being given them in this type of evaluation. This can be readily determined, however, for any particular case depending on the rate of energy charge. Second, where single phase is involved, the addition of the second phase may be advisable or necessary to obtain better load balance on the substation. It is difficult though to evaluate such a factor.

Regardless of these offsetting factors, however, these comparisons leave no doubt, in the writer's mind at least, that there is a definite place for the rural type of line regulators.

Use of Shunt Capacitors

Shunt capacitors, up to the present time at least, have not been applied on light load density and rural lines to any extent as compared to their application on urban systems. This is probably due to the fact that in the past these circuits have generally not been loaded to the point where it was necessary to provide any corrective equipment at all. It can be shown, however, that shunt capacitors can be logically applied to light density circuits. In fact, the return on investment in capacitors for most light density lines is in general much greater than on urban feeders. This is true even though a kva. of capacitors does not release as many kilowatts on a rural line as on an urban feeder. Their economic justification on rural lines is based on the fact that the

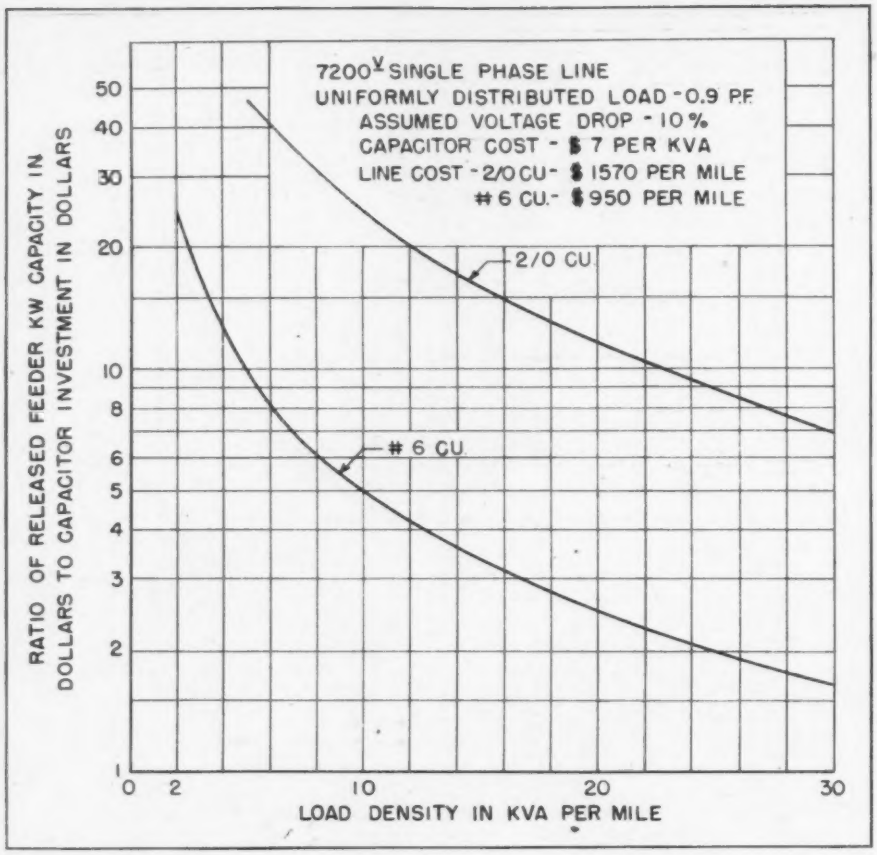


Fig. 4—Investment return on light density feeders with shunt capacitors

kilowatts released on such lines are worth considerably more in dollars.

In the past, shunt capacitors have been applied to electric utility systems for several reasons such as reduction in kva. demand on circuits, improvement of voltage conditions, reduction in energy loss and released system capacity at such points as the substation, the subtransmission line and even the generator. Evaluation of some of the benefits such as reduction in energy loss and released substation or transmission line capacity are quite well recognized and they will be referred to only in passing, but it should be pointed out that capacitors applied on feeders result in benefits not only to the feeder but to the entire system, back to and including the generator. The one benefit which will be discussed here in some detail is the relative comparison of released kilowatt capacity on light density feeders.

It is obvious that if a rural line is not loaded, capacitors cannot be justified except on the basis of benefits derived elsewhere in the system. As the line becomes loaded, however, the capacitor lends itself particularly well to obtain the maximum line capacity at minimum cost. This is especially true of the longer lines having light load density and is becoming of more and more importance at the present time because of the expected increases in load on some of these long light density circuits.

Increase in kilowatt carrying capacity of the feeders is due primarily to the reduction in full-load voltage drop resulting from the application of shunt capacitors. The increase in kilowatt carrying capacity is directly proportional to the voltage rise effected by the capacitors.

On lines having small wire, the reactance is somewhat greater than on lines having larger wire. This effect tends to increase the voltage rise produced by the capacitor and thus tends to increase the kilowatt carrying capacity effected by the capacitor. On the other hand, there is an opposing effect produced by the resistance of the wire which tends to decrease the voltage rise produced by the capacitor.

There is another factor which must also be considered. For a given amount of voltage rise effected by capacitors, the increase in kilowatt line capacity is less for small wire than it is for large wire because a kilowatt of load consumes more voltage drop and more line capacity on a line having small wire than with one having large wire. Because of these factors, the impression has been prevalent with many operating engineers that, although capacitors show great benefits on urban feeders, they cannot be justified on rural feeders which are characterized by small wire.

This viewpoint obviously has some justification. On the other hand, the fact that is frequently overlooked is that, although a capacitor releases less kilowatt capacity on rural lines than the same investment would on an urban type of feeder, the value of this released capacity may be worth considerably more on a rural feeder. A kilowatt of line capacity on a rural feeder can easily cost ten to fifteen times that of a kilowatt of line capacity on an urban feeder.

In order to convey some idea as to the comparative return on light density feeders due to the application of capacitors, the information shown in Fig. 4 has been prepared. In preparing this chart, the line was assumed to be single-phase, 7,200 volts, having uniformly distributed load of approximately 0.9 p.f. and load densities from 2 to 30 kva. per mile where studied. It was further assumed that the maximum allowable voltage drop would be 10%. Two sizes of conductor, namely No. 6 and 2/0, were considered. These probably represent the extremes for most cases insofar as conductor size is concerned.

For the various conditions shown, and assuming the conditions just enumerated, the value of the released kilowatt capacity and the installed cost of the capacitors required to release this amount of capacity was calculated. The ratio of these two gives a measure of the return to be expected through the use of the capacitors. It can be seen from this chart that a better return is obtained on the larger conductors and the lower load densities, although the return for the small wire sizes and the higher load densities are by no means insignificant. Although this chart is based on 7,200 volts only, the return to be expected for other voltages ranging from 4 kv. up to 13.2 kv. will be of the same magnitude when using corresponding wire sizes.

Thus, from this chart it can be seen that there is definitely a place in distribution system design for the application of shunt capacitors on light density circuits. The return when considering only released feeder capacity should be sufficient to justify the use of shunt capacitors in many cases, and if reduction in energy losses and release of substation capacity is also evaluated, there will be many more cases where the shunt capacitor can be not only justified but used as a tool to reduce system cost.

When studying the application of shunt capacitors to feeder circuits, there will be found cases where it would be desirable for various reasons to add more capacitors to the line than could be allowed due to excess voltage rise at the end of the line under light load conditions. This brings up another point which may have been overlooked by many operating engineers.

This point is that, although certain very definite benefits can be obtained through the application of shunt capacitors by themselves or regulators by themselves, the use of regulators and capacitors in combination is a "natural". In other words, the use of both of these types of equipment on a given circuit allows the maximum benefit to be obtained from each. This can be illustrated briefly in Fig. 5.

Regulators and Capacitors

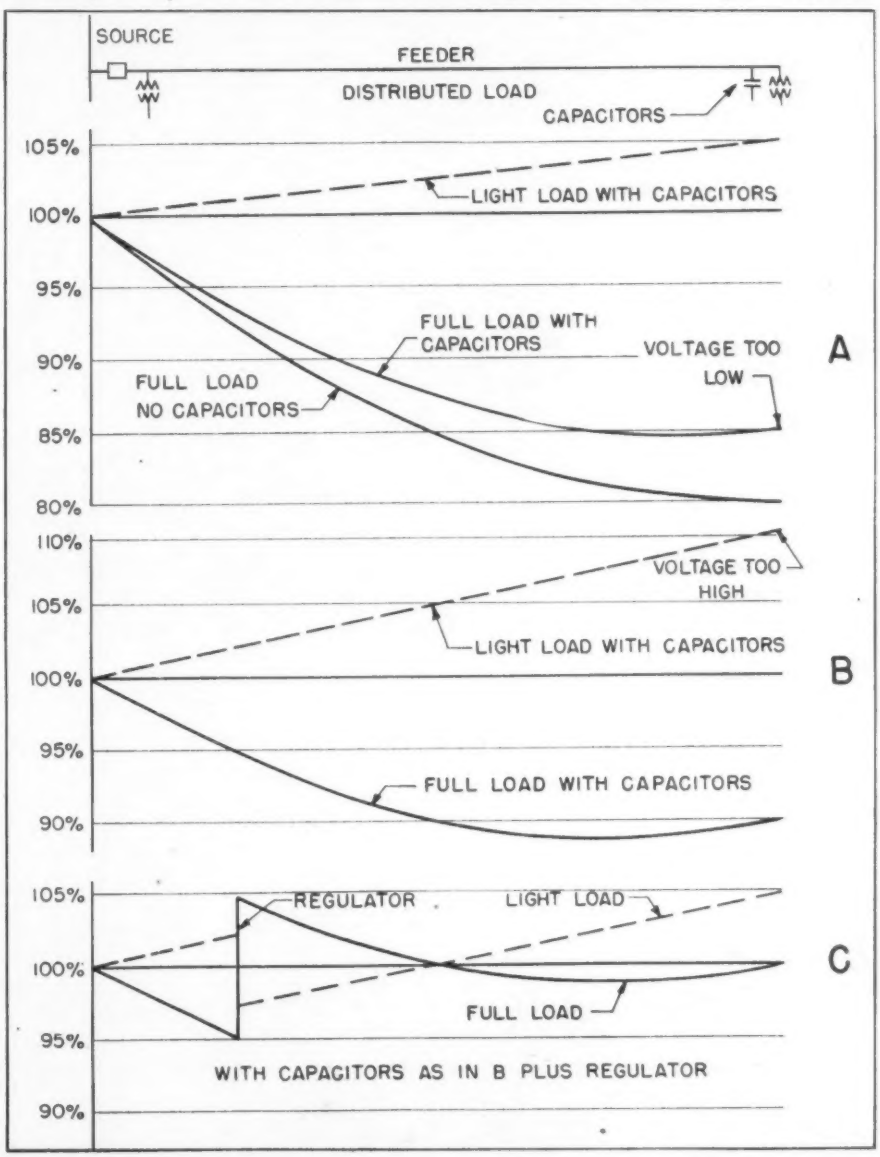
On this chart is shown, at the top, a simple radial feeder which might be either three phase or single phase carrying load approximately uniformly distributed along its length. At or near the end of this line is installed a bank of capacitors. For purposes of illustration, it has been assumed that this feeder is loaded so that it has a primary voltage drop from the source to the end of the feeder of approximately 20%. At first, this value might seem to be excessive, however it could well represent many present-day circuits serving light load density areas if the load on the circuit should increase appreciably.

The voltage profile along the circuit under full load conditions with no capacitors is shown in the lower curve of A. Now, if the capacitors on the end of the line are of sufficient size to produce a voltage rise at light load of 5% as shown by the dotted line, it will be seen that the voltage at the end of the circuit under full load conditions is still too low to give adequate service. If capacitors only are to be used, more capacitors might be added to the end of the line. For example, as in B, enough capacitors are added to the end of the line to produce a voltage rise of 10% under light load conditions and producing approximately 10% maximum drop along the feeder under full load conditions. This full load condition might be considered tolerable. However, the light load condition produces a voltage at the end of the circuit which is entirely too high, 105% being considered an average maximum value.

If now, this represents a condition which would be obtained due to adding capacitors to the end of the circuit for reasons other than obtaining voltage correction, it would still be possible to allow this many capacitors to stay on the feeder and obtain reasonable voltage conditions. This could be done by adding a 10% boost regulator as shown in C. Here the regulator is giving full 10% boost under full load conditions and producing very good voltage levels all along the line. Under light load conditions, it will buck the voltage down approximately 5% allowing only a 5% overvoltage on those customers near the end of the line. Thus, the addition of a regulator to this line has allowed the full complement of capacitors to be added, with the resulting benefits, whatever they might be, and allowing considerably better average voltage conditions to be obtained all along the line than if either the capacitors or regulators had been used separately.

In this analysis the basic consideration has been one of trying to obtain maximum load capacity for minimum investment and operating cost. It has been shown that the use of regulators on circuits can allow more load to be carried with relatively small added investment, or the rebuilding of existing lines or building of new lines can be delayed or completely eliminated. The use of shunt capacitors can likewise show returns far in excess of their initial cost of installation and in the end it was shown that the combination use of regulators and shunt capacitors can be a natural team working together to produce over-all benefits considerably in excess of those that could be obtained if these two types of equipment were used separately.

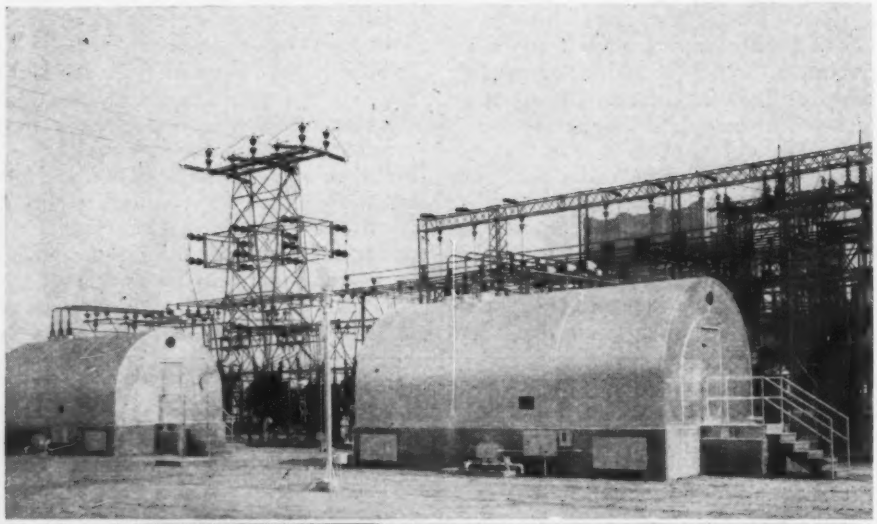
Fig. 5—At top is shown radial feeder, either single or three phase, carrying uniformly distributed load and with capacitors at or near end of line. Assumed loading produces primary drop of approximately 20%. Lower curve of A shows voltage profile with no capacitors. Center curve shows voltage with sufficient capacitance at end of line to produce 5% rise at light load. Voltage drop is 15%, which is too low for good service. If sufficient capacitance is added to produce 10% light load rise, conditions would be as in B, with 10% drop at full load. Light load voltage would be too high under this condition. The capacitance that produced this condition could be allowed to stay on the feeder if a 10% boost regulator were added, as in C. Here the regulator is boosting 10% under full load conditions, producing very good voltage levels along the line. There is only 5% over-voltage at light load which is quite tolerable

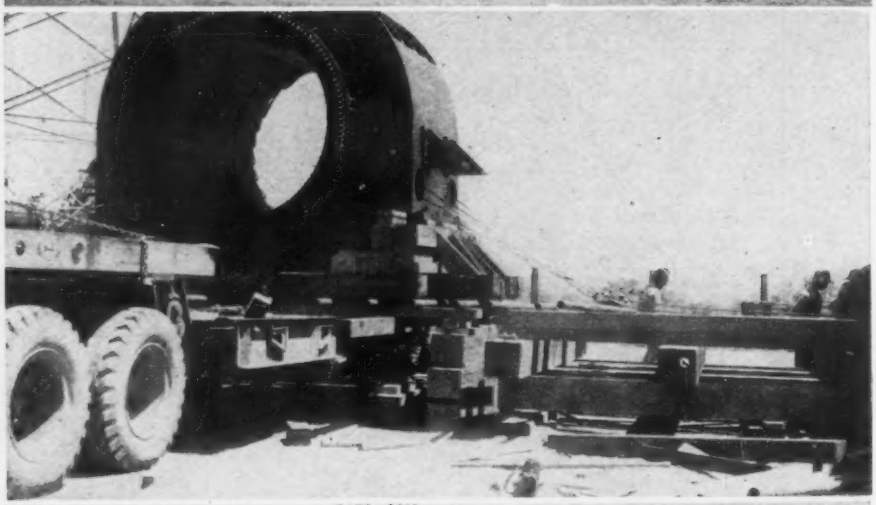


Condenser Assembly Without Crane

Two 25,000-kva., outdoor type synchronous condensers are easily assembled without crane at Herndon substation of PG and E

A. J. Swank and P. S. Gehringer
San Francisco





Completed view (top) of two 25,000-kva., air-cooled, outdoor type synchronous condensers installed without crane at Herndon substation of PG and E. First step in erection was to roll stator off semi-trailer (center) and mount on foundation. Step two (lower) was to move rotor from truck onto cribbing preparatory to placing on foundation

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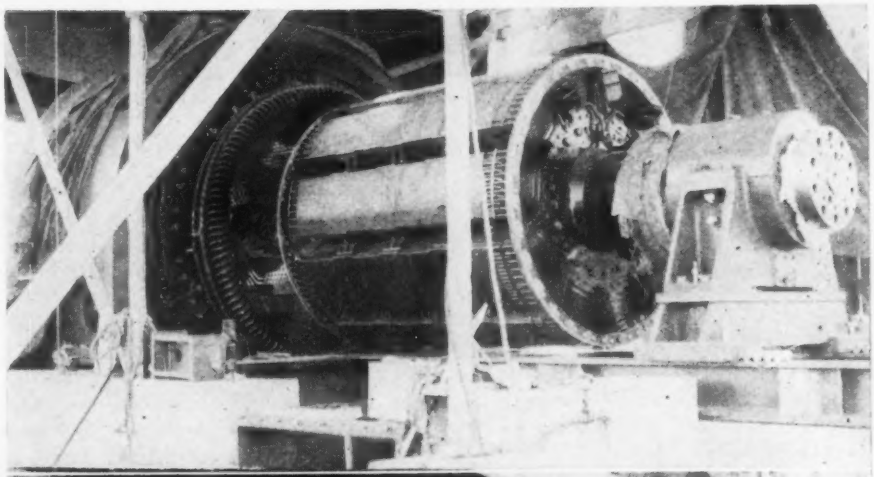
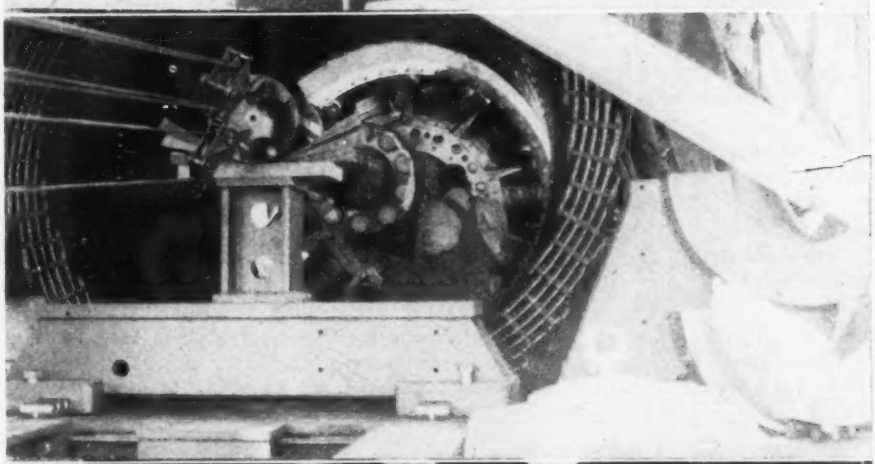
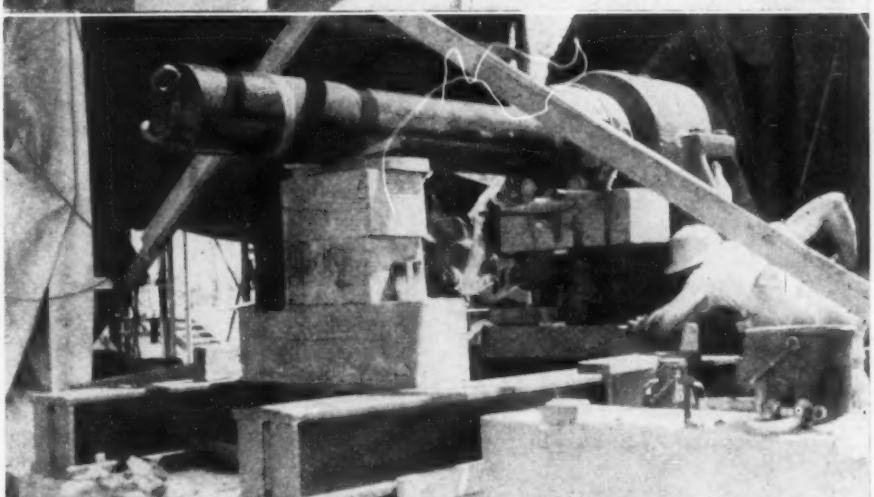
PACIFIC Gas and Electric Co. recently installed at its Herndon substation near Fresno two 25,000-kva., outdoor type, air-cooled General Electric synchronous condensers. No crane was available at the site. While many such machines have been assembled in the field without the use of a crane, the fact that these machines were provided with features to aid in erection made the job so simple as to be of interest. The accompanying series of photographs show the more important steps in erection.

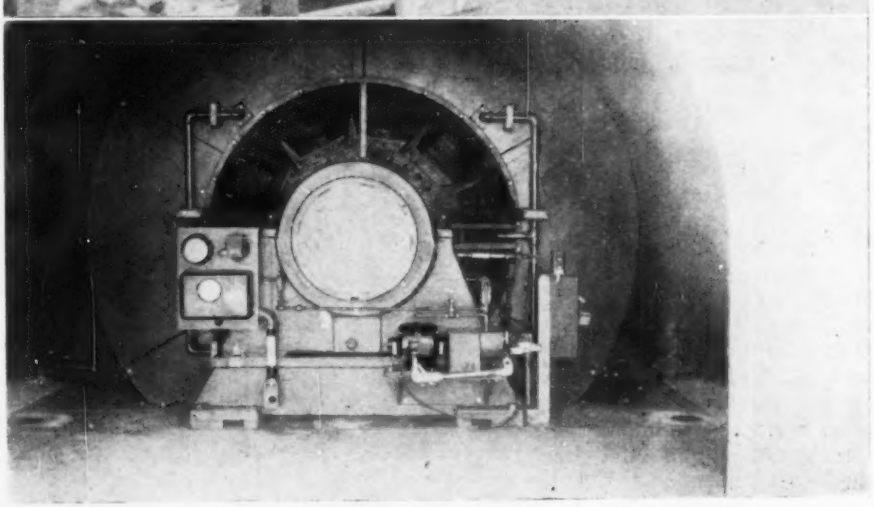
The stator was provided with four heavy brackets which were bolted to the stator frame, two on each side. By means of a jack under each of these brackets, and with safety blocking under the stator supports, it was lowered on to the base quite easily. To facilitate the assembly of the rotor in the stator, extension bases were provided, one on each end of the main base. These extension bases were doweled and bolted to the main base and grouted in the same manner.

The rotor was brought in on cribbing and rollers until it rested on the extension base. The outside bearing was mounted on the journal and the weight of that end was carried on the bearing and pedestal. On the end of the shaft next to the stator, an extension shaft was bolted. This extension shaft extended into the stator. Segmental blocks, cut to fit the inner circumference of the stator, supported the weight of this end of the rotor, and the









From top to bottom—1. Rotor being moved to position inside stator. Rotor was brought in on cribbing and rollers until it rested on the extension base. Outside bearing was mounted on journal and weight taken on bearing and pedestal. 2. On the end of the shaft next to stator, an extension shaft was bolted, extending into the stator. Segmental blocks supported weight of this end of rotor. In the pedestal sub-bases there had been factory machined blocks so spaced that centers were on centers of the base extension beams. Blocks were then used to pull rotor into stator. 3. Shaft extension is used to position rotor. 4. End view of the completely assembled condenser with the housing in place

bearing pedestal resting on the extension base supported the other end.

In the bottom of the bearing pedestal sub-bases were machined axial blocks about 3 in. wide by 2 in. deep so spaced that the centers of the blocks were on the center of the base extension beam. The pedestal sub-base was raised by means of jack bolts, and gang rollers were inserted in the slots. The load was let down on these rollers, which were then contained in the slot. When resting on the rollers, the rotor was raised about ¼ in. above its final position.

The shaft extension in the stator was placed on pipe rollers and supported by the curved blocks in the stator frame. The rotor was moved forward until the end of the staff extension protruded from the stator. At this point the bearing pedestal sub-base was mounted on gang rollers on the base extension, and the shaft extension supported on this pedestal sub-base by means of blocking.

The rotor was supported on one end on its bearings and pedestal, and on the other end supported by the bearings, pedestal, sub-base, and blocking. Both ends were mounted on the gang rollers. The segmental blocks were removed from the stator, and the rotor rolled into the stator by means of a winch line pulling from the end of the shaft extension. It required very little pulling effort and the rotor could be pulled into the stator with a block and tackle.

The rollers were then removed by raising the pedestal slightly with the jack bolts and pushing the gang rollers out of the slots. The shaft extension was long enough that the rotor could be drawn out clear of the stator without having to support it in the frame.

Major assembly of the machine was made with only 107 man-days of labor, the crew varying from two to eight men. A winch truck was required for 30 hours and a crane truck for four hours in addition.

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Industrial Electronic Tubes

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San Francisco

IN the ever expanding field of industrial electronics, engineers glibly use many strange and confusing terms to designate types of industrial electronic tubes. Some of these terms were originally trade names coined by manufacturers, while others have been given fanciful names by their designers. Few people have a clear understanding of the fundamental differences between these varied industrial tube types, notwithstanding the fact that the basic theory of electronic tubes is now fairly well known. It is the purpose of this article to explain commercial industrial tube names and to briefly outline their fundamental characteristics and use. It will be assumed that the general theory of the electronic tube is understood.

All electronic tubes are basically rectifiers, that is to say, they permit the flow of the current in one direction only. Some types of industrial tubes are used exclusively as rectifiers, while in others the rectifying action is merely incidental to their main function. In general, within the tube itself, the current flows only from the cathode to the anode. The cathode is the source from which the electrons are emitted, while the anode is the plate towards which they move. One way to remember the direction in which the current flows within the tube is to recall that a "cat" spits when annoyed—the cathode also spits electrons when activated These electrons carry the current toward the plate or anode. Electrons, the contribution of the cathode, are received on the plate within the tube. Between the cathode and the anode there may or may not be other elements whose function is to control the electron flow. Usually these are known as grids. They will be mentioned further in connection with the tubes in which they are used.

Before the cathode will emit electrons it must be activated. The usual method of doing this is by heating it. Such tubes are called hot cathode tubes. There are however many types of cold cathode tubes, for example the tube wherein light is the activating agent. The cathode is usually made of oxide coated and thoriated tungsten. It may be directly heated or indirectly heated. Fig. 1 shows the conventional symbol for a direct heated cathode tube. Here the cathode and the filament are one and the the same. This is the lower element in Fig. 1, the upper element being the symbolic representation of the plate. Fig. 2 shows the conventional indirect heated cathode. Here the filament supplies heat only, while the cathode emits the electrons. Such a tube has four electrical terminals, as can be readily seen from the diagram. Both tubes are simple rectifiers. Fig. 5 shows one way to connect such a tube in a simple circuit to serve as a rectifier. This is known as a half-wave rectifier. It is mentioned here only to illustrate the use of the conventional tube diagram in an electrical circuit.

For convenience, industrial electronic tubes may be divided into two general classes — vacuum tubes and gas-filled tubes. The word vacuum as used here refers to as high a vacuum as is commercially possible. In the case of a gas-filled tube, we usually mean one containing a small amount of gas at very low pressure. Actually, the tube is far from being completely filled as the name might imply. In fact the very word "gas" is misleading as mercury vapor is used in many instances. However, some tubes do contain a small quantity of a true gas such as helium or argon. Inert gases are used to avoid chemical action within the tube while it is in operation.

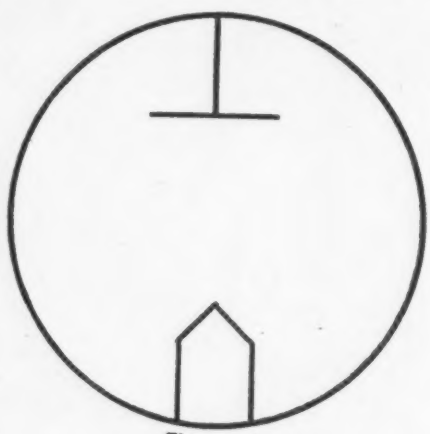


Figure 1

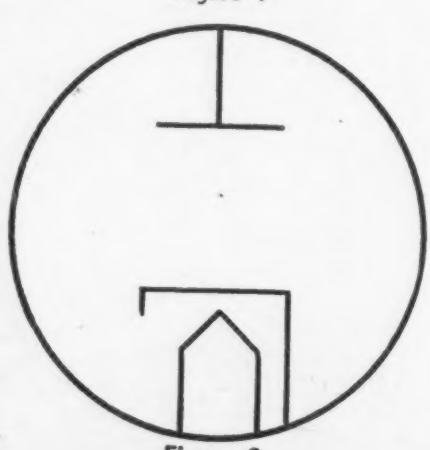


Figure 2

Vacuum Tubes

Kenotron—This is a simple two-element high-vacuum tube. It is primarily a rectifier and is used to rectify high voltage where current values are comparatively low. Typical applications are as a rectifier in radio work and to supply direct current to other industrial electronic tubes. The Kenotron is used also to supply high voltage used in cable testing and for filtering air by use of an electrostatic field. Kenotrons may have either directly or indirectly heated cathods. The conventional symbols of Fig. 1, 2 and 5 represent Kenotrons. This tube is also known as the diode (two-element) tube and is the original Fleming Valve.

Pliotron—A high-vacuum tube with one, two or three grid elements in addition to the usual cathode and anode. The purpose of these grid elements is to control the flow of the current (electron flow) within the tube. Grid elements are usually in the form of fine wire mesh and are made of molybdenum wire, iron wire, iron-nickle alloys or manganese-nickle alloys. The theory of the control of the electron flow by means of these grid elements is beyond the scope of this article. These elements may be thought of as traffic policemen whose duties are to start, stop and regulate the flow of electrons within the tube. A conventional Pliotron diagram with two control grids indicated is shown in Fig. 3. The Pliotron is also known as a triode, tetrode or pentode, depending on the number of elements contained. Fig. 3 shows a tetrode, that is, four elements. Actually the term Pliotron applies to a basic tube type which is available in a variety of forms. Such tubes are used for radio amplification, high-frequency heating and to produce high-frequency radio waves.

Magnetron—In the case of the Pliotron, it was pointed out that the flow of the current within the tube was controlled by means of one or more grids. Because these grids are given electrical charges, this type of control is called electrostatic. In the case of the Magnetron, we have a vacuum tube controlled by a magnetic field rather than by an electrostatic field. Basically,

the Magnetron is a diode or two-element tube, as the coil or coils used to produce the controlling magnetic field are external to the tube itself. At the moment this tube has little use in the industrial field, its application being primarily in connection with radio, radar and high-frequency communication work. It promises to come into wider use as the field of industrial electronics expands.

Klystron—A special type of vacuum tube developed during the recent war. Here control is achieved by means of a resonance chamber. Like the Magnetron, this tube is used almost entirely in radio, radar and high-frequency detection devices. It is mentioned here merely for the sake of completeness.

Cathode Ray—A very versatile tube for which more and more industrial uses probably will be found. It is a vacuum tube shaped somewhat like a megaphone with an extended mouthpiece. A fluorescent screen is coated on the inside of the large end. This screen is caused to glow by the impact of the electron stream. Within the tube is the usual cathode, a control grid, two accelerating anodes and two sets of deflecting plates. Fig. 6 shows the general schematic arrangement of this type of tube. Here the beam of electrons is "shot" against the fluorescent screen producing a luminous spot. This spot can be made to move in a vertical plane or a horizontal plane or in a combination of both by merely varying the electrical charges on the proper deflecting plate. Thus a line or even a complete image can be made to appear on the fluorescent screen. Cathode ray tubes are so called because the beam of electrons from the cathode appear directly on the fluorescent screen. This tube is the basis of television receivers. By its means images are reproduced on radar sets. Industrially, it is used in oscilloscope for testing, inspection and circuit analysis. It is the tube in which we can *see* the image of the electron stream.

X-ray Tubes — Mention should be made here of the X-ray tube inasmuch as this is a high-vacuum electronic tube. Here high-speed electrons from the cathode strike a metallic target (the anode) and give up their energy there, causing the target to give off radiations of very short wave length. Whereas the cathode rays are really streams of particles of matter, X-rays are truly like light waves. These light waves are so short that they will pass between the atoms of many elements, thus giving these rays their great penetrating power. The X-ray, originally of medicine, is rapidly finding more and more applications in industry. These are so well known that it is needless to enumerate them here.

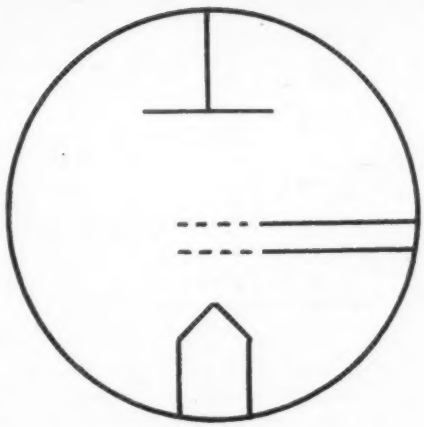


Figure 3

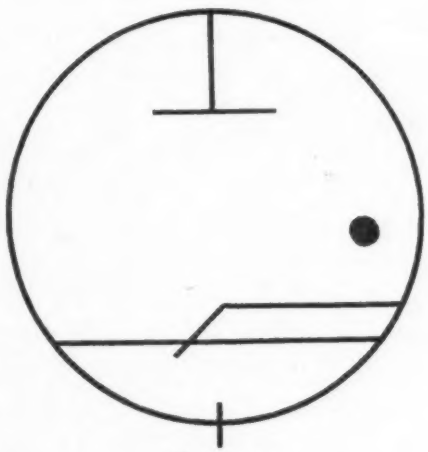


Figure 4

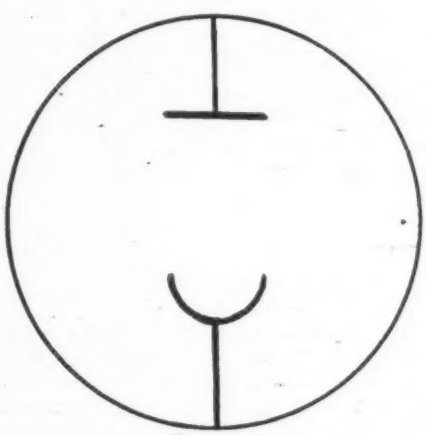


Figure 7

Dynatron—This is a special application rather than type of high-vacuum tube. It is usually a triode with a negative resistance characteristic used to produce high-frequency oscillations. By negative resistance characteristic, we mean a flow of power into a circuit instead of out. Its principle uses are in communications work rather than in the industrial field.

Vacuum Phototube — This type of tube contains a cathode which emits electrons when activated by light rather than by heat. It is a cold cathode type tube. Substances emitting electrons under the influence of light are barium, cesium, potassium, rubidium and sodium. Fig. 7 shows the conventional diagram for a vacuum photo tube. Light is directed into the cup-shaped cathode which appears as the lower element in the conventional diagram of Fig. 7. Popularly known as the electric eye, the high-vacuum photo tube finds its principle use in sound motion pictures. While not as sensitive as the gas-filled photo tube, its response to variations in light is rapid with very little time lag. It was for this characteristic that it was chosen for applications in translating light fluctuations into audiable sound.

Gas Filled Tubes

There are two outstanding characteristics possessed by gas-filled tubes which are not found in the high-vacuum type tube. First, because of the presence of a gas (or vapor) it will conduct more current for a given applied potential than will a high-vacuum tube. Because of this characteristic, it finds wide application in industries requiring the rectification or control of considerable quantities of power. Second, the gas-filled tube can only start the flow of current within itself. It can not stop the flow of current once it has started, nor can it control its magnitude as does the high-vacuum tube. This characteristic of the gas-filled tube has been called *trigger* action. It finds wide use in industrial applications requiring split second timing. In general, gas-filled tubes are essentially power devices, while vacuum tubes are communication and control devices.

To represent gas-filled tubes symbolically, a large dot is placed within the tube enclosure. This dot may be placed in a convenient position and is the accepted representation of a gas-filled tube. Note the dot appearing in Fig. 4 denoting that this is a gas filled tube.

Tungar—This is a high-current low-voltage tube which finds its principle application as a battery charger. A spiral filament of tungsten forms the cathode and a graphite button acts as the plate (anode). It contains argon gas at a pressure of about 5 cm. of mercury. The filament of the tungar tube is operated at a much higher temperature than can be used in a high-vacuum tube, so that it has a very high emission efficiency. The symbol of the Tungar tube is similar to Fig. 1, with the addition of a dot to indicate that it is gas filled. As already mentioned, its principle industrial application is for battery charging purposes.

Rectigon—This is simply another trade name for a high-current low-voltage tube similar to the tungar. Its

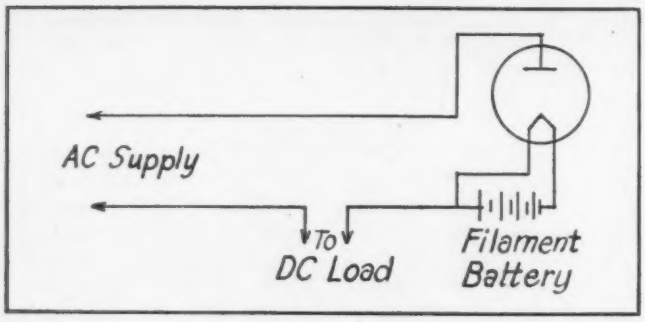


Figure 5

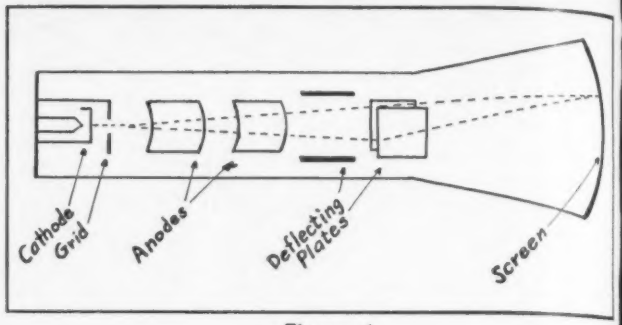


Figure 6

characteristics and applications are identical with the Tungar tube.

Phanotron—This tube is somewhat similar to the Tungar except that it operates at a lower filament temperature. It is filled with mercury vapor instead of argon, which vapor has not enough density to prevent the evaporation of the filament as does the gas in the Tungar. It is therefore necessary to use the most efficient emitter obtainable as a cathode. Its symbol and application are similar to the Tungar. In addition to its use as a rectifier for battery charging purposes, it is often used to subject direct current required by other electronic tubes.

Thyratron—A mercury vapor hot cathode tube with one or more control grids. The cathode is usually of the indirect heated type except in Thyratrons of very small size. It is probably the most popular and most versatile tube used in industrial control applications. The symbol shown in Fig. 3 with a dot added will serve to illustrate the typical Thyratron. The grid of the Thyratron will not permit electrons to reach the anode as long as a certain negative voltage is maintained on the grid. When this voltage is reduced below its critical value, the grid suddenly permits the full flow of electrons to start towards the anode. Once the flow starts, the grid (as in any gas-filled tube) loses control over the flow. In an alternating-current circuit, the flow stops when the cycle reverses, causing the anode to become negative. This in effect resets the trigger for the next operation of the tube. Thus the grids controls the starting (but not stopping) of the plate current. In resistance welding, the Thryratron times the heavy welding currents with split second precision. Thryratrons are also used to run direct-current motors directly from alternating-current lines (a use that is rapidly increasing in popularity) and to maintain the desired motor speed, regardless of changes in the load. Thryatron are the key tubes in practically all industrial electronic control applications and are generally used in combination with other electronic tubes.

Ignitron—This tube is radically different in construction from any of the tubes discussed so far. In the Ignitron the cathode is a pool of mercury in the bottom of the tube. Its function is to supply a tremendous number of electrons that will carry the rather heavy current control lead by the tube. Unlike other tubes, the Ignitron has what can be considered a cold cathode, since it is not necessary to apply heat to the cathode to liberate electrons. Instead, a starting electrode called the ignitor, causes a spark to form on the surface of the mercury pool. As this spark spreads over the mercury's surface, it causes an arc to start between the anode and cathode, provided a suitable potential is applied at the time the spark is struck. This starts the flow of current within the tube. Once the ignitor has started the flow of electrons, it has no further control of the current. The ignitor circuit may be controlled by other electronic tubes. It is a circuit which is entirely separate from the main circuit of the tube. The symbol for the Ignitron is shown in Fig. 4. The mercury pool cathode is indicated in the bottom of the tube and the ignitor is seen as dipping into it. The dot in the diagram indicates this is a gas-filled tube. After the initial start by the ignitor, the mercury pool continues the operation of the tube by supplying huge numbers of electrons which in turn makes it possible for this tube to handle considerably more current than other types of electronic tubes. Commercial Ignitrons are available which will handle 20,000 volts at 200 amp. Ignitrons have three major industrial applications. Heavy-duty inversion, that is, changing direct current to alternating current. It is the work horse of the electronic tube family and is finding more and more applications in heavy industry.

Glow Tube—A cold cathode gas-filled tube without a control grid. Electrons are literally pulled out of the cathode by a high difference in potential between the cathode and anode. This tube is a two-element tube (cathode and anode) and possesses the unique property of being able to maintain a constant potential, regardless of fluctuations in load. Because of this property, the glow tube finds use in industry as a voltage regulator.

Grid Glow Tube—A cold cathode gas-filled tube similar to the glow tube mentioned above with the addition of a grid which can be made to effectively control the start of the electron flow between the cathode and the anode. It is an extremely sensitive tube, that is an almost imperceptable change of grid potential, when the grid is maintained at or near its critical value, will cause the start of the electron flow. For this reason it finds application in devices requiring great sensitivity such as safety controls, burglar alarms, etc.

Gas Phototube—The popular electric eye tube. Similar to the vacuum phototube, the gas-filled phototube is used in applications requiring extreme sensitivity. However, if the light changes are rapid, the gas-filled phototube loses its advantage over the high-vacuum tube in sensitivity. This is because of the response lag which is characteristic of this type of tube. Thus the high-vacuum phototube finds use in applications where light fluctuations are rapid (sound moving pictures) while the gas-filled tube is used in devices of comparatively slow light fluctuation. It makes up for its slower response by its greater sensitivity. Industrially the uses of this tube are familiar. It finds application on door openers, counting devices, sorting, grading, etc.

The tubes enumerated here are by no means a complete list. Only the better known and most used tubes in industry have been mentioned. New tubes are being designed almost daily and new tube names are constantly being coined. However, it is hoped that this list will clarify some of the confusion that exists between the electronic tubes more commonly found in industrial applications.

References

Fundamentals of Vacuum Tubes—Eastman.
Electronic Tubes and Their Application—Morecroft.
Electronic Tubes in Industry—Henney.

Drying Powdered Milk by Electricity

Experiment at Farmers Cooperative Creamery in McMinnville, Ore. holds promise of many more similar applications of electric heat

POSSIBILITY of using electric heat for producing powdered milk is being watched with interest by commercial engineers of utilities and manufacturers. The Farmers Cooperative Creamery Co. at McMinnville, Ore., began such an experiment in May of this year by operating an electrically heated spray process milk drier. The war demand for whole milk powder and fact that the milk supply was in excess of existing plant facilities, led Jack Wright, general manager, and Simon Nagley, superintendent, to experiment with use of electric heat. Ordinarily such heat for the spray process driers is obtained from steam. However, with insufficient boiler capacity to operate additional driers, this creamery studied the steam heated driers already operating to determine the capacities of electric elements necessary. With such data a twelve-nozzle Rogers type drier was designed to use electric heat.

A finely atomized spray of previously concentrated homogenized milk is introduced into a stream of air sufficiently heated to evaporate the balance of the water in the milk. The milk powder is collected and moist air discharged to the atmosphere.

In this electrically heated machine moist air is passed through a heat exchanger which partially heats the incoming filtered fresh air. From the heat exchanger fresh air is conducted over electric heating elements before entering manifolds leading to the spray head. A milk nozzle is located in the center of the air stream in each spray head. Such spray heads discharge into a closed roomlike structure of sufficient volume to allow the powdered milk to settle to the floor.

Fine powder that does not settle by gravity is then removed from the moist air stream by a cyclone type of dust collector and is returned to the settling room by a screw conveyor. An automatic mechanically operated drag mechanism continually removes the powder from the collecting room floor and delivers it to a screw conveyor which transfers it to the packing department. The lining of the collecting room is stainless steel because all parts that come in contact with milk powder must be kept sterile.

Dry milk powder is packed in tin cans after being sifted. The cans are then evacuated and given a charge of nitrogen. When packed in this manner the powder will keep indefinitely in any climate, according to the manufacturer.

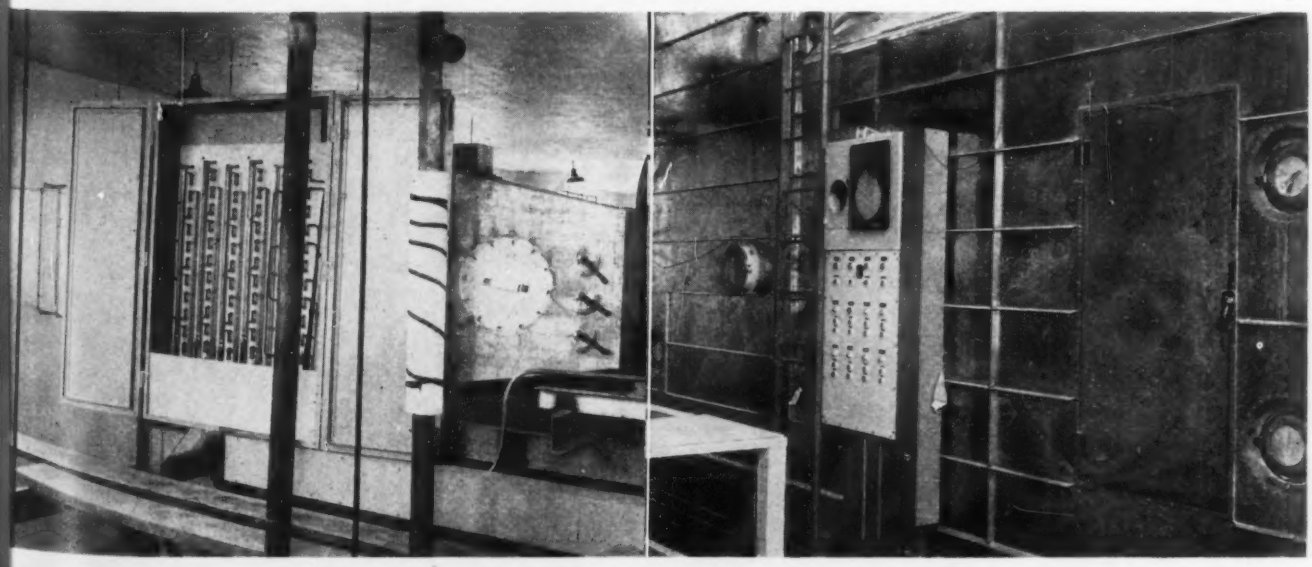
Of interest to the electrical industry are the tests that show that, when the milk has previously been evaporated to a solid content of 40%, the balance of the water can be removed in the electrically heated equipment with a consumption of not more than ¾ kwh. per pound of powder. Likewise, it was shown that, although the total installed capacity of the heating elements is 576 kw., the maximum fluctuation in demand necessary to maintain the required 320°F. air temperature was 28.8 kw. Although the capacity of the drier was designed for 500 lb. of powder per hour, it has been shown that this production can be materially increased.

To make the equipment practically foolproof, automatic temperature controls and protective devices are used. Recording thermometers produce a continuous record of the operations and an alarm system warns the operator of any irregularities occurring in operation.

Power comes from the McMinnville municipal system, which is served by Bonneville Power Administration. However, a diesel standby plant is maintained to assure uninterrupted power supply.

The following organizations and persons cooperated in the surveys, designs, construction and erection of the equipment: Farmers Cooperative Creamery Co., Jack Wright, general manager, Simon Naglev, superintendent; City of McMinnville, Milton H. McGuire, manager, water and light department; American Sheet Metal Works, Bruce Morrison, chief engineer; Farnham Electric Co., Ralph Farnham, manager; Bonneville Power Administration, Mark M. Clayton, industrial engineer, Lower Columbia district; and the C. E. Rogers Co. of Detroit, Mich.

Heating element cabinet, showing connections for 3-kw. finned Calrod elements in six banks, 96 kw. each; control board



Organized for

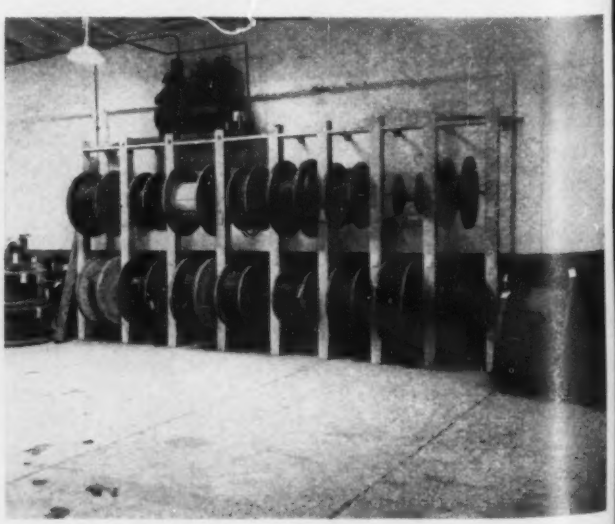
Ample stocks and accurate control San Jose contractor to serve any

Ready for and actively cultivating every type of electrical construction business in the local field and yet able to do big jobs elsewhere, Roy M. Butcher, electrical contractor, 520 W. San Fernando, San Jose, has one of the best organized business establishments. To do anything from house wiring to motor rebuilding, it is completely departmentalized. Below shows the 24x102-ft. motor shop, specializing in quality workmanship. This motor shop features modern equipment, electric oven and separate office, all under the supervision of James Buckingham

Below, Roy M. Butcher, in his modest efficient-looking office. Above, Butcher, standing, confers with Elmer W. Reid, assistant manager, left, and Architect Kress. Offices along the front, 30x60 ft., also provide for three engineer-estimators on staff

In what had been the telephone company's shop, a building of 18,000 sq. ft., with a rear yard in which is located a long, heavy tool and ladder shed, there is ample room for stocks of supplies as large as those carried by many jobbers, a fleet of ten pickup trucks under cover at night, offices and motor shop. Additional property adjacent provides parking and room for expansion. Below is shown the conduit racks which wall in the tool room. Electricians do not have access to tools or stock in stock handling plan

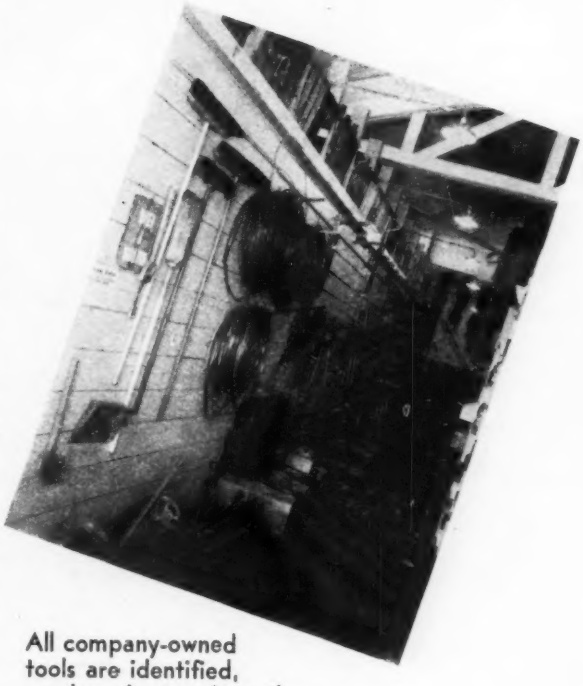
Only the conduit (with kegs for short pieces) and the cable reels are on the main service floor where the trucks come in to load. All heavy cables are purchased in full reels and racked in two tiers, shown below. The floor is marked off in feet so that cable can be reeled out, measured and cut. Inventory on each reel is written on a tag affixed to the reel. Measurements are kept accurate to the foot in order to conserve copper and to know exactly if there is enough for each measured run before cutting



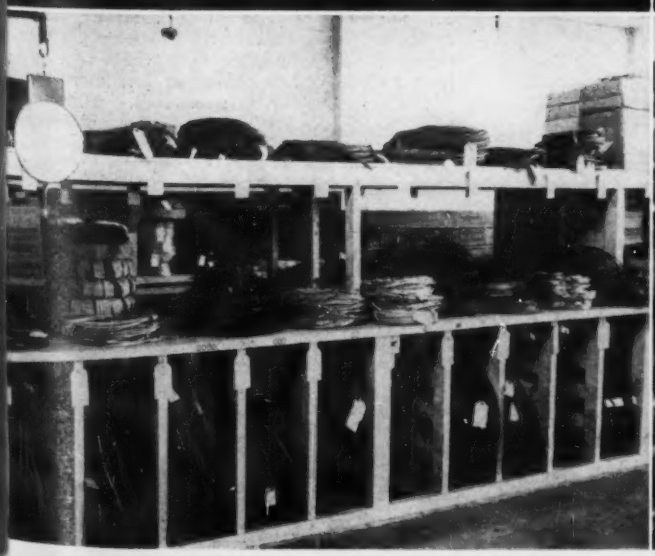
All 'Round Service

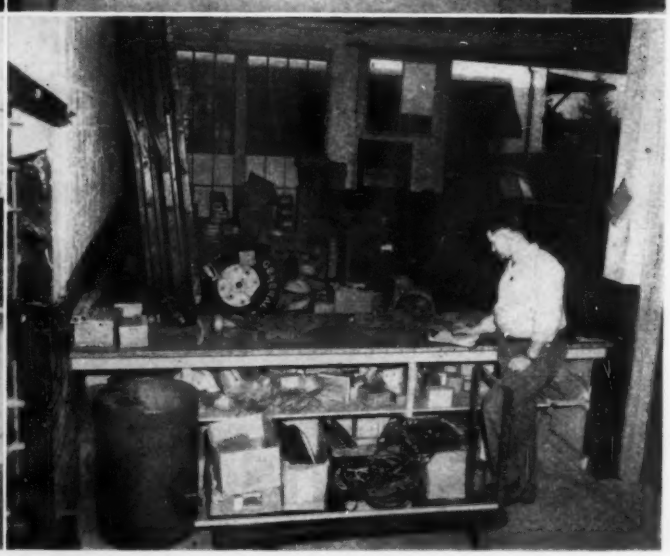
of materials and manpower equip this electrical requirements of the area

Accurate stock control and labor dispatching more than pays what it costs in administration, Butcher says. Elmer Reid, his assistant manager, formerly with Associated Wholesale Electric, Los Angeles, instituted the stock control, which is operated by Roy E. Butcher (in the picture below), eldest of five Butcher sons. Two shop boys assist. Incoming material, whether from wholesalers or back from a job, is checked and credited as accurately as it is charged out on jobs. Short ends of wire are measured, tagged and racked as shown below. Material for the next day's jobs is assembled between 4:30 and 6 p.m., loaded on the trucks after they come in at night, and they are ready to roll at 8 o'clock the next morning, with men assigned, a drawing of the job, a bill of materials, special tools and ladders needed, everything well organized. Superintendent Ralph Millard dispatches the wiremen to the jobs. A record of where every man, every truck, every tool is supposed to be is kept at the control desk in the 30x64 stockroom pictured at right. At lower right, material for next day's jobs is being assembled at the counter separating the service shop from the stockroom and toolroom. Not shown here are the additional storage room, where large stocks of fixtures and wiring supplies are kept; a residential fixture display



All company-owned tools are identified, numbered, stored neatly





LIGHTED CEILINGS

Who

Unlike the typical shoemaker whose own children remain unshod, Lou Spott, of Spott Electric Co., Oakland. started his new technique of lighting by installing it in his own office as shown in the upper picture. Since then, using it as a sample, several other installations have been made. Pictured here also is the kitchen in the home of William Harden, furniture dealer. Engineering and design by William Powell, Spott Electric Co., which also furnished "Cathon" tubing.

The Need

Ample illumination for seeing everywhere in the room, without any conscious source of light in the visible range. Lighting that is completely utilitarian; is not wanted for special decorative effect but is an inconspicuous part of room.

Conditions

In Lou Spott's office, a small office (10x15 ft. 8 ft. 6 in. ceiling) with a large plate glass window facing south where natural light is so intense that it needs to be shielded by venetian blinds, it was desired to provide comfortable seeing in all parts of the room, equalizing it for visitors and proprietor. Walls were tinted light blue-green of high reflection factor, furniture is of bleached finish woods to keep contrast ratios low.

In the Harden kitchen, natural light from window over the sink was often insufficient because of a step bank rising near the window outside. All cabinets and appliances are finished in white.

Installed

In Spott's office, a total of 2,500 watts of "Cathon" cold cathode 20-mm. tubing, mounted on sign type insulating fittings, 1½ in. from the ceiling, on 4-in. centers. Each tube is U-shaped and both terminals plug into Cisco fittings, mounted in a metal gutter along one side of the ceiling. High-voltage, aluminum point shielded cable to each is carried in this trough from the transformers, which are banked in a cabinet in an adjoining room. The wall switch at the door operates a contactor which controls the current on the primary side. Five inches below the ceiling, which is painted a flat white, is suspended a complete skylight ceiling of acid etched ribbed glass in removable panels, supported on metal strips hung from rods affixed to ceiling at 4-ft. intervals.

The Harden kitchen skylight ceiling (approximately 10x10 ft.) is similar in construction except that 20.-mm 60-ma. Cathon tubes are run on 18-in. centers and the transformer is mounted outside. A heavy-duty wall switch is used to control the current to the primary of the transformer. (Illustrations at the left show ceiling with some of glass removed).

Results

Initial intensity everywhere in the Spott office was 200 ft. candles with no variation. Brightness of the ceiling was approximately 200 ft. lamberts as compared to 400 on bare 20-mm., 60-ma. tubing, and 520 on bare 40-watt white fluorescent lamps.

In the Harden kitchen, 50 ft. candles throughout, with a maximum variation of 5 ft. candles.

In both there is the impression of a room flooded with sunlight without being conscious of where it comes from.

Surveys Prepare for School Relighting

Each room of each school studied and data tabulated for school officials by Edison Co. staff

IN THE welter of talk about school lights it is reassuring to learn of a quiet but constructive piece of work to determine beforehand just what the conditions are, so that more intelligent planning can be done about improving existing lighting conditions. Such a work has just been completed recently by Southern California Edison Co. in cooperation with the school officials in the cities of San Bernardino, Compton, Orange, Santa Paula, Chino and La Canada. To make sure that it was done thoroughly and completely, George Rankin, director of lighting for the Southern California Edison Co., made the survey himself, together with the local lighting or power man in each district, and sometimes with the principal or superintendent of schools.

A simple but complete survey report was mimeographed in sufficient quantities to provide a sheet for every room and office of every school surveyed. Prior to this survey, the school people were asked to measure the rooms, and determine the size of the lamps in the fixtures. Such information was to be put on a sheet of paper in each room. This hastened the survey, which was made in the daytime while the classes were in session.

Usually three people made the survey: One with a light meter, one with a brightness meter and the third putting down the information on the survey report.

Brightness readings were taken for the high and low extremes in each room, with the light turned on both in the room and in the adjacent hall. The idea was to determine the brightness ratio so that high contrast can later be eliminated.

Information taken down on the report included the date, time, weather, name of the school and its address, number of the room, size of the floor and room dimensions, type of floor covering, number of windows, primary exposure and secondary exposure of the windows, color of the ceiling, side walls and trim, condition of the walls and ceilings (whether good, fair or poor), the location of blackboards, type of window blinds and their condition, whether the seating was formal or informal, type of lighting fixtures, number, size of lamps, whether photocontrol was installed. Then intensity of light on the desks with the highest and lowest and average reading was given, as was intensity of light on the desks in foot-candles when the lights were off, high, low and average. A reading was taken of the brightness in the line of vision on the interior, both high and low, and exterior in foot-candles, high and low. Space was also provided for listing the type of activity carried on in the room and remarks of other kinds.

From these data a report was then compiled for schools and buildings. A typical report contained three pages of general observations about school lighting, four typewritten pages consisting of a report on the conditions found in that particular school and nine pages of recommendations for improvement.

As an indication of the conditions found, brightness ratios were found ranging from two foot-lamberts to 40,000 through an outside window. Other great contrast was found where windows faced bright stucco walls and the blinds were open. The obscuring glass used in many partitions was also found to have a high sheen and the corridor lights were often visible to the children in the school room, creating brightness contrast ratios of a high order. Dark floors in contrast to bright walls were also found.

In general, the recommendations suggested the use of an asphalt tile in gray or tan or that the existing floor coverings be sanded down and refinished in a light color, that the woodwork be bleached on the desks. Suggestions were made for colors of paint and surfaces and that obscuring glass be rendered inoffensive by reducing the glare by painting, if possible. Type of shades for the windows was discussed and the informal seating arrangements recommended by Dr. Harmon of Texas was suggested as a means of eliminating facing windows where high brightness ratios would be encountered by the eyes of the pupils.

In the section suggesting supplementing natural lighting with artificial lighting in general a recommendation of 100 lumens per square foot, which is roughly one 500-watt totally indirect lighting unit for each 100 sq. ft. of floor area, was suggested as a standard. Switching of the lighting is also discussed; incandescent lighting is recommended, preferably of the totally indirect type, because of the lower first cost and the reduction of maintenance both electrical and in cleaning of the fixtures and lamps. Photoelectric control of classroom lighting is also suggested.

First results from the survey have been found in Orange, Calif., which has rewired and relighted two out of its four schools and which plans to do the two others this next year. Other schools are contemplating such improvements, but the outcome depends upon bond issues which are being placed before school district voters.

Each survey is in effect a simplified engineering study and as such, together with the reasonable and logical presentation of recommendations, makes a good working document for the school officials in the planning of relighting and rewiring of school structures.

● A COUNTY ORDINANCE has been passed in the county of Santa Clara, Calif., covering building, plumbing and electric as well as gas service. The ordinance is to go into effect Jan. 1, 1946, and an electrical inspector will be selected by the county to administer it. The combined building code is the 1943 edition of the Uniform Building Code of the Building Officials Assn. and incorporates the National Electrical Code and the administrative provisions of the PCEA uniform ordinance. A concession was made to agriculture exempting wiring on farms of 2½ acres or less, but not houses built by contractors on such farm premises.

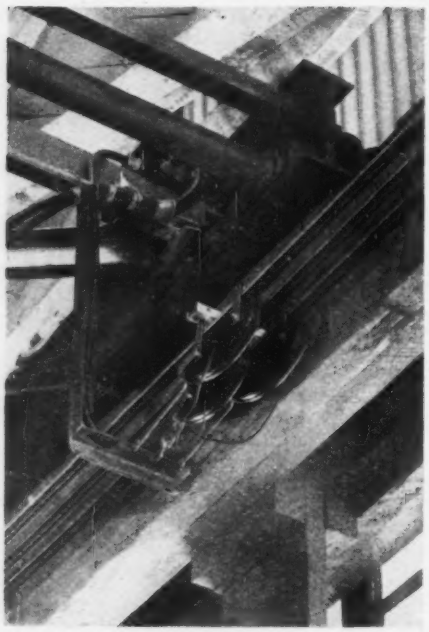
● WARTIME RELAXATIONS on construction codes were removed by the Board of Building and Safety Commissioners of the city of Los Angeles. Installations covered by permits issued prior to Oct. 15 could continue to be on wartime standards but since then the prewar standards of the city of Los Angeles were to return. Principal effect of this was the elimination of non-metallic wiring systems within the city of Los Angeles.

● BECAUSE of price uncertainties, manufacturers and wholesalers lately have been qualifying their quotations and their published price sheets with a statement that orders are accepted subject to the price in effect on date of shipment. Because of the volume of back orders, the wholesalers are fearful of being caught by price increases, increased labor costs, etc.

● ATTENTION was called to a mistake on Page 84, August ELECTRICAL WEST, in which the formulas for determining demand had the fraction in the horsepower formula inverted. Floyd S. Lorentz called this to our attention. It should read "watts/746."

Guarded Trolleys Required

California inventor develops ingenious and safe method for protecting conductors against contact



Instead of open conductors, the three necessary for this crane are placed close together in this installation

NEXT to booms of cranes, derricks or well-digging equipment coming in contact with high-voltage overhead lines, one of the greatest causes of industrial accidents and fatalities has been the accidental contact of workmen with exposed trolley conductors of traveling cranes and monorail hoists. Such accidents come either from accidental personal contact with the wires by workmen who do not suspect their danger and are working in their proximity, or from the contact of such wires with metal or other current-carrying materials.

The need for mobility of traveling cranes and monorail hoists makes exceedingly difficult the protection of such current-carrying conductors. For this reason safety codes have recommended shielding or guarding, but have not insisted upon it because of the unavailability of equipment which would still provide the flexibility and movement needed.

At the last meeting of the Electrical Committee, National Fire Prevention Assn., makers of the National Electrical Code, one little word was changed in Sec. 6121h. That word was "should" and it was changed to "shall." The paragraph now reads:

"Except in locations to which only qualified persons are admitted, collector conductors *shall* be so isolated by elevation or be provided with suitable guards so arranged that persons cannot inadvertently touch the current-carrying parts while in contact with the ground or with conducting material connected to the ground."

This provision was made mandatory in the rewriting of the Code because now there are available several means by which collector wires or conductors may be guarded. A number of trolley duct systems and guards are available from several manufacturers.

The California State Safety Orders have had a clause in them which, while somewhat ambiguous, covers the same ground. Orders have gone out to the inspectors from the State Division of Industrial Safety to enforce these provisions. Specifically the safety order, Sec. 7-3004-A, states:

"When collector wires or conductors are so placed at any point that persons are liable to come in contact with them, or to bring conducting material into contact with them, they shall be effectively guarded at such locations. Monorail collector wires or conductors shall be installed to conform to one of the following methods: . . .

"(2) They may be installed at a height of less than 10 ft. above the floor if they are so inclosed or guarded that persons cannot come into accidental contact with them or bring conducting objects into contact with them."

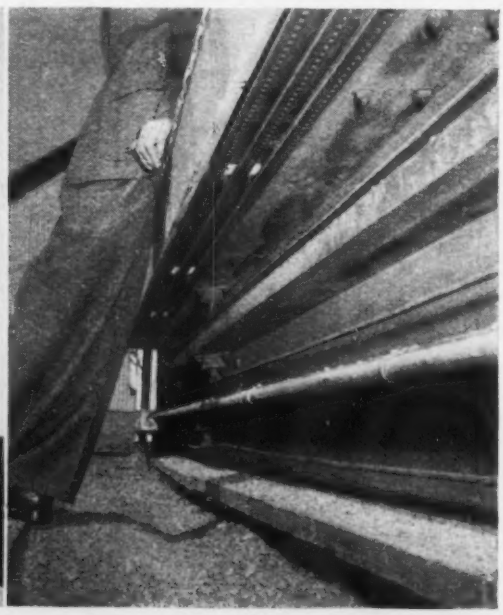
Looking over the record, the Department of Industrial Safety points out that in 1943, of 33 cases of serious injury due to contact with such contact conductors or collector wires, 16 were fatal; in 1944, 8 out of 9 were fatal, and in 1945 3 out of 7. Often a victim is knocked off of a high scaffolding or ladder by the electric shock and his major injury comes from his fall to a concrete floor.

Among the various protected trolley systems available is one invented by a California inventor, Bert Benbow, and which has been installed on a number of Navy installations and in several California industrial plants. How it came to be invented is an interesting story.

Bert Benbow, who operates the Benbow Inn at Benbow, Calif., on the Redwood Highway 200 miles north of San Francisco, was a tool, die and watch maker and general all-around mechanic. He built his own hydroelectric plant and installed a diesel engine standby and has operated his own machine shop. With power available throughout the property and several craneways, he sought some method for protecting the trolley conductors or collector wires so that the children of his own and other families would not come in contact with them. In his design is something of the caterpillar tractor and a pinion rack. He built the original rubber molding machinery from available metals including an old plow and some of this equipment is still being used in the newly organized company which manufactures the product at South San Francisco.

As the illustrations show, the system consists of a totally encased copper

Now abandoned unprotected traveling crane conductors replaced by TracTroly



conductor bar in a molded rubber sheath with slotted rack openings on the underneath side. The installation is rigidly retained and supported by a formed metal strip which is suspended by means of clamps and hanger brackets mounted on 4-ft. centers.

The collector trolley is a traveling suspension on four roller bearing wheels operated along the metal chase of the track conductor. An endless-tooth collector chain revolves only when the trolley is towed. Rotating around two idler sprocket wheels, it provides a positive six-tooth contact with the conductor bar at all times. To insure good contact, an automatic spring tension is exerted by the contacting teeth of the collector chain as dry lubricating alloy collector shoes compensate for wear.

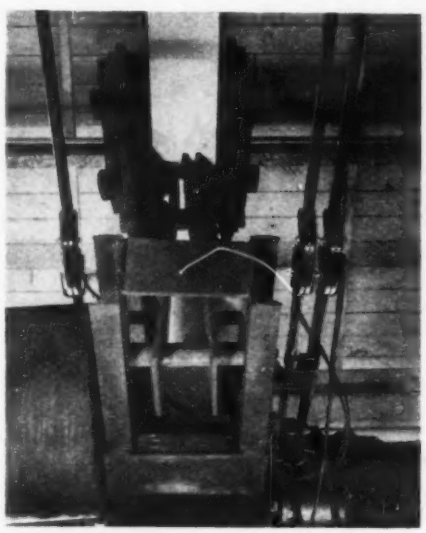
The conductor is made up in standard 10-ft. lengths completely assembled and ready for installation. Each end of the conductor is threaded with ¼x28 threads, one end being female threads, the opposite male threads. The conductor is free within the rubber insulation and permits makeup and adjustment after each standard length is hung. Recently a new lock key hanger was developed to make assembly easier and to permit a freer movement of the trolley wheels.

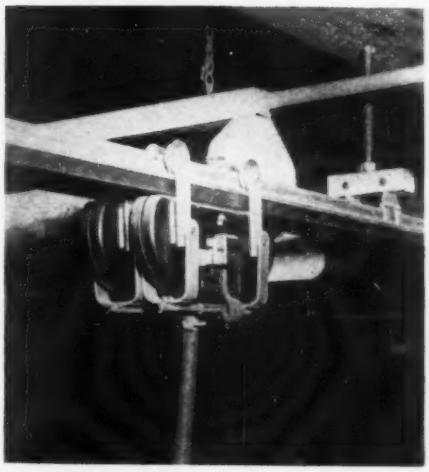
Being small in size, the conductors can be suspended from the same hangers which have previously supported ordinary exposed collector wires or trolleys or, in new installations, can be placed much more closely together for compactness and saving of space.

Terminal boxes and power feed sections are provided for feeding the main conductor from adjacent sources.

Because the teeth of the endless chain collector are concave and six of them are in complete contact with the conductor at all times, there are no flashovers or arcing and resulting fitting and notching of the copper trolley wire. Sufficient contact area permits the collector to handle more than twice the load carried by the conductor which can handle 100 amp. or even more without heating. The system is designed to operate on single or multiple phase a-c or d-c circuits up to 600-volt capacity.

Installation is relatively simple, and operation so far over a long period of time has demonstrated its ruggedness and flexibility.



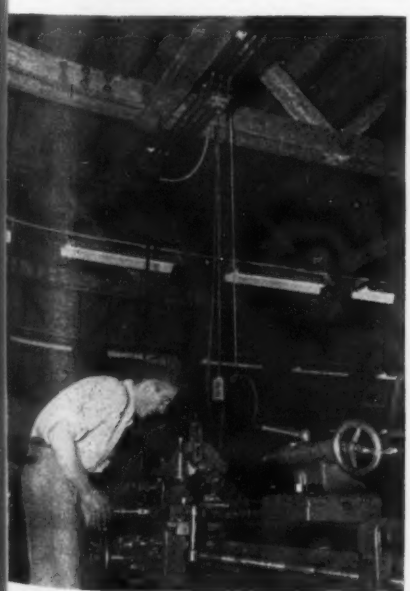


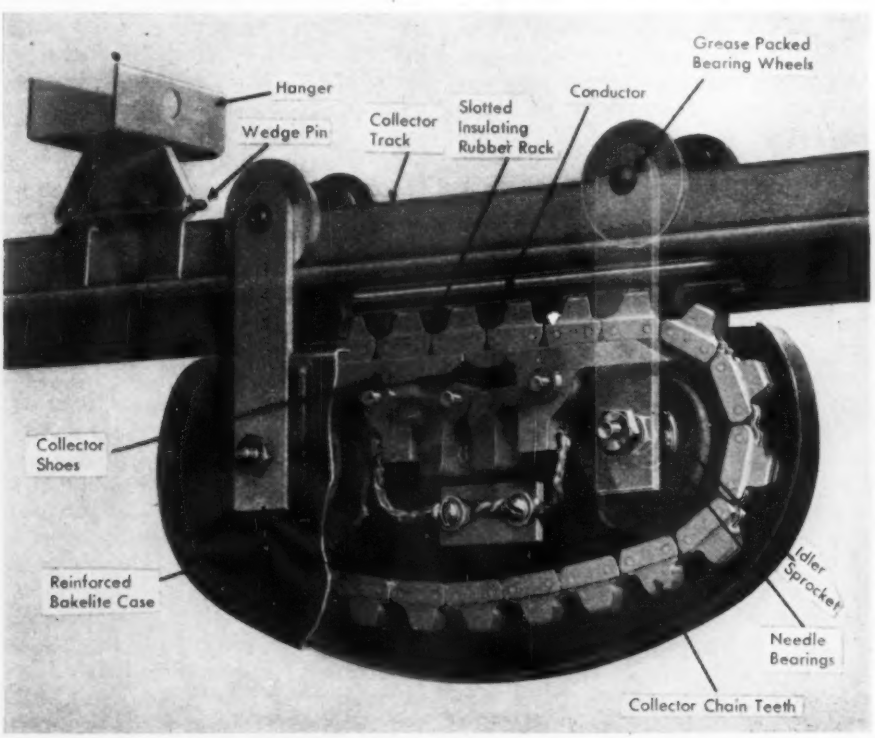
Used as service to portable tools, two of the TracTrolys in close parallel, above. At left, conductors of a monorail hoist replaced by this safer method

Installations have been made at Hunter's Point and Mare Island Navy Yard, the Alameda Air Base, Ames Aeronautical Laboratory at Moffett Field, where there are fifteen cranes equipped with it. The Steel Tank & Pipe Co. at Berkeley has it on ten cranes and soon will convert completely to its use. Wooldridge Mfg. Co. is 100% equipped with it. There are some in Lockheed Aircraft and Douglas Aircraft at Los Angeles, as well as other installations which have been in long enough for the field tests.

The system has also found rather ingenious uses in some of the Navy yards to serve portable tools and also to provide a mobile push-button control which can be moved anywhere along the bed of a long metal lathe.

Ingenious construction of the current collector and protected trolley conductor of the Benbow system, at right. Below, system used on the push-button control to follow work over a long bed





Why Reinspection Should Come First

M. Kennedy Bliss
Electrical Engineer, Board of Fire Underwriters of the Pacific

"YEA, THE FIRST shall be last, and they that are last shall be first." So sayeth the Lord (St. Matthew 19:30, St. Mark 10:31, St. Luke 13:30), and so it seems to be in the electrical inspection service. The most hazardous electrical installations—the wiring that causes the vast majority of all electrical fires and electrical shocks—are not inspected nor checked in any way. And conversely, the wiring that is installed to take care of present-day electrical loads and has all new installation and equipment —is carefully inspected.

If there was no possibility of advancement in the electrical industry; if there was no possibility of increased loads; if insulation maintained forever its dialectric strength and parts never wore, then the electrical inspection service of today would be entirely adequate.

It doesn't take a genius to discover that the electrical industry enjoys the most rapid growth of all industries, that progress has been very rapid in the past and will be even more rapid in the future, that installations considered adequate and the latest thing today will be found inadequate and outmoded tomorrow.

This is a condition that is always true. This is the reason why wiring installed today must be inspected tomorrow. Our problem and our solution are in old wiring. Old wiring is found in the vast majority of properties. Old wiring supplies the vast majority of outlets and fixtures; and, last but by no means least, old wiring causes the vast majority of all electrical fires and electrical shocks.

Reinspections, however, are not easy to make. It is dirty work and requires ability and tact never exercised in new work inspections. It is in this work, though, that our greatest value lies and we will be neglecting the greatest portion of our responsibility if we do not perform this service.

To put it in another way—what is the object of electrical inspection? What is our goal? What do we wish to accomplish? There is and can be only one goal—to safeguard the public against the hazards of fire and electrical shock. To do this we must give assistance to the vast number of properties demanding present-day service and appliances, who now have outmoded and inadequate electrical supply systems.

The benefits from regular reinspections are immediate and far-reaching. While made to promote public welfare, they have a profound influence on the entire electrical industry by providing profits and work all down the line—labor, sales, service and inspection. Furthermore, they bring the inspection department into closer contact with the public and thus present an excellent opportunity of selling the inspection service to the general public.

Most inspection departments are not equipped for this additional work. More inspectors are needed and considerable tact and enterprise must be used to educate the public to the realization that reinspections are for their benefit and protection. Old installations need not be made standard, but rather they should be made safe. The making of old installations adequate is not our privilege but rather that of the owner. We can, however, require that what he has be safe, and at the same time have the opportunity to point out to him the advantages to be gained from improvements and new installations.

Inspectors assigned to making reinspections should devote their entire time to this service. Otherwise they will find that it is only too easy to gradually switch to easier and less important work. Furthermore, constant attention is necessary to keep the men experienced and the work up-to-date. Inspectors devoting their entire time will find reinspections interesting and much easier than their critics predicted.

It is neither necessary nor advisable to make reinspections frequently. It is important, however, that they be made regularly. Locations where the life hazard is high—such as hotels, rooming houses, auditoriums, theaters, hospitals, schools and other places of public assemblage — should be inspected annually, mercantile property and industrial plant every two years, dwellings and apartments every four.

Invariably the thoughts of the new inspector starting out to make his first reinspection are full of misgivings. He feels that the property owner may be suspicious and antagonistic, that he himself may be unsure of his ground, and the work will be disagreeable. Experience, however, quickly changes all this. The inspector finds that owners are deeply interested in the welfare of their property and are glad to work with city officials whom they find to be reasonable, progressive, able and cooperative. The "reinspector" soon learns that he is the most fortunate person in the inspection service. The requirements of his office are more exacting, possibly, but he is more than rewarded by the many loyal friendships earned, a deep appreciation by the public, and the knowledge that through his efforts a major step towards safety to life and property has been accomplished.

The fact is, this work is so vitally important to the future welfare of all of us that it takes no stretch of the imagination to realize that reinspections are more important than original inspections. If we had a choice of one or the other, our city would be far safer with regular reinspections than with just new inspections. If our city had no requirements for new work but made regular reinspections of old installations, we would be accomplishing, for the most part, the goal of the electrical inspection service.

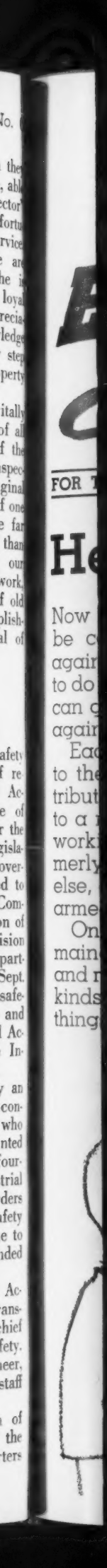
Change in Name

A new division of industrial safety has emerged from a division of responsibility within the Industrial Accident Commission of the State of California. Move was made after the last session of the California legislature upon recommendation of Governor Warren, when it was decided to devote the Industrial Accident Commission entirely to the adjudication of claims and to create a new division of industrial safety within the Department of Industrial Relations. On Sept. 15 the new division of industrial safety took over all of the functions and duties performed by the Industrial Accident Prevention Bureau of the Industrial Accident Commission.

The new division is guided by an industrial board of five members, consisting of the department director, who is chairman, and four others appointed by the governor for overlapping four-year terms. This division of industrial safety enforces all safety orders adopted by the board. General safety orders heretofore adopted continue to remain in effect but may be amended or repealed by this new board.

All employees of the Industrial Accident Commission have been transferred. P. H. Fry remains as chief of the Division of Industrial Safety. George E. Kimball, electrical engineer, Frank Short, and others from that staff are in this new division.

In San Francisco the Division of Industrial Safety moved from the State Bldg. to more ample quarters in the Balfour Bldg.,



ELECTRICAL WEST Sales Guide

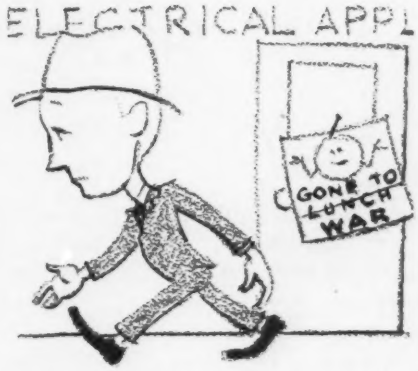
FOR THE ELECTRICAL MERCHANT OF THE WEST © DECEMBER, 1945

Hello Again—

Now that selling can come out of its foxhole and be considered essential, very essential in fact, again, it is high time for this Sales Guide to return to do its bit to aid you. If we can get paper and you can get some merchandise, we'll all be in business again.

Each in our own way, we **have** been attending to the business at hand—you as a dealer in distributing the available appliances, new and used, to a needy public; or by keeping repaired and in working condition those appliances you had formerly sold. Perhaps you "converted" to something else, closed up shop and went into war work or the armed services. More power to you.

On our part we sought to bring to those who remained in business information and methods, ideas and regulations, services of many practical, realistic kinds. Those who read and made use of these things profited thereby.



Whether you shut up shop for the duration or weathered it through, things have changed a lot. A wise dealer will study why and adjust his plans to the new conditions.

Now the appliance factories are almost reconverted and the first trickle of a flood to come of new appliances is being noticed. Now, too, competition will be keener. The business will shift quickly from a sellers' to a buyers' market. Everybody, it seems, thinks the appliance business is a good one to get into, so there are far more dealers than there were.

Of course you will be flooded with sales helps. Every manufacturer will pour out beautiful printed matter to support the products he wants you to sell. In no sense does this Guide seek to supplant such material. Instead it should help you digest it, employ it to better advantage in your own Western community by making it fit local conditions and people. **Electrical West** will simplify selling plans and ideas, point them directly at our Western kind of people and their needs.

Let's look into the crystal ball and see the

Salesmen of Tomorrow

"It just kills my soul to come in contact with some of the Zombies that clutter up the selling profession," Tony Whan told the 500 dealers, salesmen and distributors who met in the Biltmore, Los Angeles, Nov. 1, 1945, to form a new dealer and distributor sales promotional association, the Southern California Radio and Electric Appliance Assn. Then he drew a large crystal ball from a scarf and murmuring mock incantations, looked into the crystal, seeking there to find the ideal salesman.

By Tony Whan

General Manager, Pacific Indoor Advertising Co., Los Angeles

THE crystal is clouding—the clouds begin to swirl, now they are clearing and we see people, lots of people, in homes reading magazines and papers, listening to radios.

We see them in cars looking at billboards. We see them in street cars and they seem to be alert to the products advertised.

We see them going into stores and shops and examining the goods displayed there. What shops, what products, what displays!

Happy people who seem to have plenty of money but are not too free with it. They're not grabbing products. They are comparing them. They are met by sales people, some good, some bad, some excellent.

As they work on the customers and as we watch, we see sales made and sales lost and as we note the technique of those making the sales, we begin to formulate an outline of the attributes that make these salesmen successful. Perhaps if we outline them for you, it will assist you in building your training program.

First, these salesmen of the future made a good first impression. They were pleasant, clean, neat and alive. No gloomy guses, no sour pusses, no gossips, no counter-leaners, no bored Berthas or condescending Sams.

Second, they seemed to like people, to take a genuine interest in them as individuals, to size up the individual as to what he wanted to know about the product. No canned presentation but rather a fitting of the qualities of the product to the personality of the individual. They seemed to make the person feel the product had just been manufactured especially for him.

Third, they knew their products. How they were made, why every curve, every button, every part was as it was and how it made this product better than others similar.

Fourth, they did not waste their time or the time of the customer, yet never seemed to hurry or to lose interest. Probably because they did not talk in generalities, but had worked out the pertinent points into simple, short phrases that not only told the story, but stimulated the imagination of the customer.

Fifth, they seemed to know the ladies and how important that proved, (for women buy 87% of your products) not intimately or personally, but ladies in general—their problems, their needs, their wants, their peculiarities and how the products they sold fit into Mrs. America's scheme of things. At first, we wondered about this until we watched these salesmen of the future on the street cars and at home.

If you were to ask a group of salesmen today what they read in the newspapers, half of them would say the headlines, then the sport page and funnies and the other half would say they read the funnies, then sport page and then the headlines. Not so our salesmen of the future. They turn immediately to the woman's page.

Just as the banker invariably turns to the

financial page and the actor the theater page, they turn to the woman's page for women are their business. They keep informed as to the newest ideas in the woman's field and the way they work these new ideas cleverly into their sales is a revelation.

Sixth, they aren't afraid to ask for the order. They do it cleverly, but they never let anyone walk away without asking for the order. What a far cry from our day when so many sales people seem to think it a crime to ask for the order. They wait for the customer to decide and tell them.

Seventh, these salesmen of the future don't stop after they have the order, for they realize no matter how badly the product is wanted, there nearly always comes an instant when the purchaser grows cold and "sorter wishes he hadn't done it" and that's when the good salesman puts his final technique to work. He must keep the customers' interest going until he gets into some other subject. A comment on the excellence of his bargain, some complimentary remark about his business, his home or what concerns him most smooths over this period and sends him away in a mood to trade again.

Yes, these salesmen of the future are good. They have a profession of which they can justly be proud ,for they are perpetuating the spirit of America.

We who have been privileged to peep into the future must realize our responsiiblity to our firms. If **we** are to survive, we must start now to build a sales training program that will assure a sales organization for our firms that can and will sell, sell, sell.

Selling has been the motivating power that has caused every improvement in the history of the world. Selling and selling methods have **progressed** through the years until in this highly specialized time in which we live, it is by far the greatest of all professions. **Selling** is a much more **complex** profession than **medicine,** or **law.** To reach the top in our profession takes a **keener intellect, a more analytical nature, more imagination and more drive** than to reach the top in other professions.

Selling is not so easy, for we are dealing with **people,** with their likes, dislikes, their whims and idiosyncrasies. We cannot stop and look up in the book how they should react. We must know from our studies, from our knowledge built from actual experience, how to handle each individual. Our minds must always be on the alert to catch that twinkle of the eye, that slackening of the jaw that shows it is time to clinch the sale or that it's too late and the sale is lost.

We know a lot about the miracles of production and the necessity for millions of jobs, but have we stopped to realize that if production, production and more production is to furnish those jobs, that sales must lead the way. For production can go only so far, then it must surely bog down unless sales are made to clear the way.

It is up to every executive to create a sales training program that fits the need of his individual company so that every salesman, for his company, is a producer and a credit to that company.

Prepare now, for come hell or high water, those firms which have not gazed into the crystal ball and have not prepared will find themselves behind another kind of ball—**The Eight Ball.**

Needed for War, Training is Needed for Sales Also

To avoid having Zombies in the selling profession, training will be as necessary as it was to prevent soldiers from becoming casualties. In the army the boys were told, **"Learn and live!"** For salesmen it may not be so drastic, but it amounts to the same thing, for it will be necessary to **learn to earn.** And earning means livelihood. In a recent Arizona dealer meeting, a majority of dealers felt that only a "briefing" on the new appliances would be needed. But briefing didn't do soldiers much good unless they had had plenty of rugged training beforehand. So take advantage of training!

So you're in the

Appliance Business

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then let's figure what's ahead

YOU are brave if you are in business these days. Never was there a time when to be in business took such audaciousness, such enterprise, such versatility and clear thinking. But that's what the free enterprise system means. To be free to go into business means that you must be willing to take the risk of losing your shirt for the sake of an equally good risk that you will make some money and greatly improve your status in life.

It means the willingness to work hard, study the business, learn the ropes, watch the corners to make little savings that add up to big ones. It means learning smart buying, studying people to know what they will buy and when, learning salesmanship so as to be more efficient in selling. It means courage to ask for orders, to ring doorbells, to cold canvass, to follow leads, to make lots of repeat calls.

As you grow, it means willingness to hire others and to study them, train them, bargain with them or their agents, account for their wages to various agencies, provide compensation and insurance, learn to get work out of them which will more than break even on the wages or salaries you pay, hire them, fire them when incompetent. This is a more important part of running a business than it used to be.

Selling is the glamor part of business. But like a pretty girl, what good is glamor if she can't cook? What good is selling if it doesn't bring a profit, if it doesn't pay? Fun, maybe, but short lived.

So there is the drudgery part of business too, the bookkeeping, the accounting, the collections, the credit ratings, the watching to keep liquid, to discount bills by prompt payment because that discount is part of the profit of good management.

These days there is a lot of government bookkeeping to be done too, reports and payments for unemployment and social security taxes, sales tax, luxury tax, besides income taxes, property taxes and automobile taxes. There's insurance. There's the determination whether to incorporate or operate unincorporated or as a partnership. There are laws and liens and licenses, and ordinances regarding installation and sometimes permit fees.

Then come civic responsibilities, charity and support of community movements. There are associations to belong to and service clubs which can mean good business contacts perhaps. All of these need to be weighed and selected. In belonging to an association, there is caution needed to see that it or you do not become involved in illegal or even borderline activities. You can't afford either the cost of the legal fight it may involve or the stigma to your good name that such might bring.

On the physical side of business is the inventory, the stock of appliances, its selection, the right proportion of various models, the number of lines, the number displayed. Stock of parts for repairs also comes into this part of business. Likewise housekeeping, keeping the stock and the store clean, operating, attractive; furnishing display pieces, actually making and changing displays. A very important part of a successful business is the arrangement for uncrating, assembling, testing, delivering and checking the operation of major appliances on the customer's premises.

Advertising and promotion is another chapter in the book of successful business keeping. Suffice to say, if you are in business, you want to be a success at it. It is such a complex thing these days that any short cuts, any quick helpful ideas should be welcome. So watch this page in future issues of the Sales Guide for just such quick, practical honest-to-goodness business running tips and helps gathered from the West's successful merchants.

Event Launches New League

Los Angeles area dealers inaugurate promotional program, introduce Jerry Weston, their manager

Danielson

LAUNCHED at a meeting of 500 dealers, salesmen and distributors which overflowed to "sitting room only" in the balconies of the Biltmore ballroom, Los Angeles, the Southern California Radio and Electrical Appliance Assn. got off to a spectacular start Nov. 1. Culmination of a year of preparatory work on the parts of its officers and directors, the aims and objects of the association were announced to the trade and the newly appointed managing director, Gerald W. Weston, introduced to his working organization.

In a combination of inspiration and practical information, spiced with a bit of pointed humor translated into Japanese, the launching banquet also introduced to Los Angeles area dealers a program for the mass promotion of forthcoming electric appliances and services.

R. H. Cockfield, manager of residential sales, Los Angeles Department of Water & Power, president, declared its purpose to be "to promote the increased acceptance, purchase and use of domestic electric appliances and radio equipment," its job to be "to provide an industry organization for the solution of industry problems, a medium for dissemination of information helpful to the business, coordinate industry-wide sales promotion programs for the benefit of all, and to tackle any job that needs to be done when it needs to be done, be it recruitment, sales training, education, for a better understanding of what the other fellow is up against," and its creed "to offer goods and services of honest value, to give a clear understanding of the terms and conditions of any sale, to stand back of all pledges made," and its goal, "a united industry."

A. T. Danielson, vice-president, Barker Bros., was the keynote speaker. Feeling deeply that the wave of strikes was defeating reconversion and causing the breaking of faith with the GI's who were returning and seeking jobs, even delaying needlessly their return home by tie-ups of shipping, he said he was dedicating himself to awakening Americans to their responsibilities under freedom. "I don't think it is fair to those kids," he said. In this country we do not depend on rich men to make things go, he pointed out. In a democracy it is everyone's job to correct injustices and he felt it is a fight the American business man, small and large, will have to take on to redirect, to re-educate the thinking of the people away from the false "isms" that are responsible for the situation today.

That the potential market that goes with high income, deferred demand and accumulated purchasing power needs to be translated into effective demand — that customers must be changed from the natural inertia of merely wanting to active buying—was the message that Walter E. Elieson, commercial agent, Los Angeles district, U. S. Department of Commerce, gave the group. Saying that before the end of 1946 appliances will come in a flood he stressed the need for preparation by house cleaning, sales training and modernization of the store and facilities. New and unexpected types of competition will appear, he predicted, citing the announcement of the starting of a merchandising organization to carry stores to each neighborhood in trailer trucks, its salesmen equipped with carts calling at every door. Its aim is eventually to sell major appliances in such a manner.

Whereas there was about a 15% decrease in number of dealers after the start of the war, that loss has been more than made up in recent months, but he said California had increased 26% in population. However, to maintain the necessary high level of national income will take an increase of income of at least 100% over 1939. In 1939 in California the ratio of retail sales to income was 60%; in 1944 only 47%. In 1939 for every dollar of durable goods, three dollars were spent for non-durables; in 1944 it was one to five. The ratio must return to the prewar pattern, and that will take extraordinary selling effort.

Something of a comedy relief was furnished between these two speakers and the remainder of the program by Wm. A. Cyr, associate editor, ELECTRICAL WEST, who presented some of the bad trade practices of the past as secretly inspired by a Japanese plot to disrupt American business and bring it into disrepute. He impersonated the Japanese spy making his report to the general staff upon the success of his underground and underhand plotting. Since such trade practices evidently were of Jap origin, Cyr urged that it would be unAmerican to employ them in the future.

The participating utilities then were called upon to outline briefly their programs of dealer cooperation. First to do so was F. V. Frey, representing the Pasadena Municipal Light & Power Department. Pasadena will do no merchandising, he said, but will assist with advertising, displays of dealer merchandise on its office floor, have contact men in the field assisting dealers and architects and promote adequate wiring. It will offer free range wiring as it has done since 1938, and has a test and assembly platform to which ranges may be brought for testing and then delivery to customers' premises. Pasadena will service ranges free for a year and after that at cost of parts and labor. As an index of potential market for ranges, Frey said that 65 homes in each 100 have refrigerators but only eight have ranges and four electric water heaters.

George Hastings, representing the Glendale Public Service Department, explained the difference in its program as to range wiring. He asked that dealers contact the department before quoting wiring cost. The department will survey the job and estimate its cost and then do the wiring. On an average it wires a range for about $15 to $20 and since 1934 has been the only range wiring organization in that city. Free service for a year on ranges and after that at cost of material, extensive local advertising, display space on its floor for dealer displays, home and kitchen planning service and dealer contact assistance were all promised.

Charles S. Kirk, representing Burbank's Public Service Department, told of his city's extraordinary growth in population. The department does no merchandising and does not offer free wiring. However, he said, it will ad-

vertise appliances and wiring extensively. A new public service building, soon to be erected, will offer display space for dealers and his department is anxious to work a cooperative program with local dealers. The department will have a home economist and will continue to service ranges and water heaters, charging only for materials. Although it offers no free wiring for old houses, waiting to see what can be worked out with local contractors, Kirk said, an allowance of $30 is made on range wiring and $10 for water heater wiring in a new house under construction.

That the Los Angeles Department of Water & Power would stay out of merchandising was the declaration of R. H. Cockfield. Nor would the department have any part-time salesmen as it once did, nor re-establish its testing and delivery program. However it pledged dealer cooperation and support, a strong advertising program in metropolitan newspapers, bill boards, truck placards which will also be available to dealers, all selling the electrical living idea. A dealer salesmen's training program, he said, had been started and given its original "run in" period, and would open for retail salesmen on Nov. 5. It is to run for five afternoons for five weeks.

No financing of dealer paper through such a thing as EFHA will be done, Cockfield said. Floor space in nine large branch offices will be available for display of dealers appliances. These will be manned by the department. The department field staff will develop and qualify prospects and every effort will be made to distribute these equitably. There will be from 25 to 30 retailer contact men, 12 to 15 home service women available for giving demonstrations in dealers stores and in homes. The architectural service bureau will aid with kitchen and laundry plans, writing layouts and offer dealers store planning service. (See ELECTRICAL WEST, October, p. 120.)

Service will be given free on ranges and water heaters for the first year and thereafter with labor and transportation free but parts charged for. Assistance toward the cost of installation will be given on a basis of $35 for the first unit, whether range or water heater, and $10 for the other. This will be retained at least during the sellers market but may be re-examined and revised later if felt necessary, Cockfield went on record by saying. He hoped, however, that the entire industry would work out some way to sell ranges at a complete installed price, delivered, set up and in operation. "Then," he concluded, "We can have real range volume."

Tony Whan, vice-president, Pacific Indoor Advertising Co., closed the meeting, except for the final talk given by the new managing director, "Jerry" Weston, with an inspirational sales talk. (See Sales Guide, this issue, p. 98). He deplored the number of "Zombies" who call themselves salesmen and do not really know how to sell or make any attempt to do so. Selling, he said, was a highly skilled

Elieson

profession and deserved training to become proficient in it.

At the end of a long session "Jerry" Weston was at a disadvantage, being both new to the group and finding all the ideas that he had wished to express said by speakers ahead of him. But he closed the meeting with a note of optimism for what the new association could do in the active and expanding Los Angeles market.

Seattle's Policy

Declaring that Seattle City Light has no intention of altering its merchandising policy in which it sells primarily ranges and water heaters, E. R. Hoffman, superintendent, at a recent city council hearing, stated that electrical appliance dealers, especially war veterans now trying to establish businesses, need have no fear. Hoffman's request to use $150,000 of City Light funds to buy merchandise for resale caused some questions as to the utility's intentions. The appropriation was approved.

"Many war veterans want to go into business for themselves," stated William Gaunt, business agent for the Electrical Workers' Union, "and they don't want to see City Light and the Puget Sound Power & Light Co. trying to do all the business."

Hoffman emphasized that City Light had, before the war, confined its sales almost exclusively to heavy appliances, especially ranges and water heaters and excluding refrigerators.

"City Light's extensive advertising of the desirability of using electricity has had a big effect in building appliance sales for all merchandisers, too," Hoffman pointed out. He also reminded that City Light does not do its own wiring for domestic sales, or the plumbing for water heaters, leaving such work exclusively to private contractors.

San Diego Bureau

At the annual election of officers and directors for the Bureau of Radio and Electrical Appliances for San Diego County, Frank J. Guasti of the Parmelee Dohrmann Co., San Diego, was chosen as president to guide the affairs of this active group over the 1945-46 period. Guasti succeeds W. W. Powell of the Coast Electric Co. in that city.

Elected to the post of first vice-president was Lou Wiese of Wiese's Ltd., to the post of second vice-president, O. G. Thompson of the General Electric Supply Corp. and to the position of treasurer, Sam L. Hall, Electric Supplies Distributing Co. Directors elected for the coming year are: Robert E. Harris, San Diego Standard Electric Corp.; Archie Marsden of the General Electric Distributing branch in San Diego; Ben Rogers of the Westinghouse Electric Supply Corp.; Albert Dryer of the Standard Furniture Co.; Paul A. Du Pont of Walker's Department Store; Elmer Small of the H. L. Benbough Co.; A. K. Chamberlain of the Refrigeration Equipment Co.; Ralph French of French's Commercial Refrigeration; Harry E. Callaway of the Tearle Music Co.; Glenn Dutton of Dutton's Radio Store; Harry Franz of Harrington's Appliances; Elmer B. Hazie of the San Diego Auto Electric Co.; Jerry Heilbron of the Heilbron Electrical Co.; Al Reynolds of Reynolds Radio; Harvey Byers of Churchill & Cassou Ltd., Escondido; Robert Swearengin, El Cajon Supply Co., El Cajon; E. W. Kinmore of the Kinmore Electric Co., Chula Vista and E. W. Meise, San Diego Gas & Electric Co.

Also included on the new board of directors will be the outgoing president, W. W. Powell, in addition to two representatives who will be elected from the electrical contracting and the radio technician's divisions of the bureau now being organized. J. Clark Chamberlain is the bureau's secretary-manager.

Too late in the month to be reported in this issue, the bureau held its annual fall conference in San Diego, Nov. 27, full details of which will appear next month. Over 300 attended; 50 were distributor executives.

Reconversion Pot Boils. What Brews?

A Marco Polo for the industry of the West brings back tidings of what's cooking in the way of promotion and sales plans elsewhere

SEND a man East to an important meeting, where ideas and methods are freely exchanged. To derive the maximum benefit for those he represented and for his industry in the West, it is good to get a brief, pertinent report from him so that all may share. Particularly so when that man is honored by being the president of the organization.

So when Victor W. Hartley, managing director of Pacific Coast Electrical Assn., now president of the International Association of Electrical Leagues, returned from the tenth annual conference at Chicago, Nov. 1-3, he was asked by ELECTRICAL WEST to report the significant things of value to the operation of associations and leagues out West.

There is well-qualified selection of significant information and ideas in the following summary by Hartley:

George F. Taubeneck, Business News Publishing Co.—In his judgment the market for refrigerators has been greatly overestimated. In many market surveys, one prospect has been counted several times. He believed that 15,000,000 automatic refrigerators would be sold in the next three years. However, his analysis of statistics from the manufacturers indicates that 23,000,000 will be produced in this same period. Manufacturers' plans are based upon the assumption of each that, (1) he will get a larger percentage of the market than he enjoyed before the war, and (2) that he will be able to smother competition.

If the great predicted backlog exists it will be completely absorbed in four or five years and then we will be faced only with a replacement market, he said.

He suggested that we drop the word "demand" from our vocabulary as it implies that we will only need a supplying organization and not a selling organization. If this situation becomes a fact, the great chain organizations like Sears, Robuck; Montgomery Ward, etc., are best equipped to meet such a "demand" business and there will be no need for the specialty sales force.

The rush of efforts to get franchises has given the manufacturers an exaggerated picture of their potential business.

Because the present picture of selling in the future indicates that it will merely be a matter of standing behind a counter and taking orders, it holds little or no attraction for most of the returning veterans and they have indicated very little interest in becoming a part of a selling organization. If, however, it means a return to the outside, competitive, creative specialty selling, he believes that it

Hartley

can be made attractive to the type of men which the industry needs.

The commission form of compensation and its past history during depression periods is largely responsible for the present, disinterested attitude toward selling.

In answer to the question, "When will production get under way?" he replied, "When will the labor situation straighten out?"

Robert C. Hill, National Electrical Wholesalers' Assn.—Mr. Hill outlined the Veterans Employment Program of the NEWA.

Ten league representatives indicated that their organizations are engaged in this Veterans Employment Program and there was a full and detailed discussion of the ways in which each operates this activity. A summation of the discussion indicates that success depends upon the addition of specially qualified staff representatives to handle the interviewing, screening and placement and that thus far the results attained have not justified time and expense of the effort.

S. E. Strunk, Cleveland League—Strunk reported upon the activities of the Electrical Maintenance Engineers and stated that in Cleveland they felt that the EME was the keystone of reconversion because of the depreciated condition of much of the industrial equipment. As soon as the wartime restrictions had been lifted, inspection trips had been arranged so that the members had an opportunity to visit the various industrial plants and see any newly developed electrical ideas resulting from their wartime operations.

E. S. Northup, National Adequate Wiring Bureau—Northup told the story of the plans of the National Adequate Wiring Bureau and presented samples of all of the material which has been developed so far for promotional purposes. Most of this was an up-to-date revision of the material which they had before the war. Among the new items were: (1) A series of four folders which the industry could mail to a prospect list furnished by cooperating builders to aid in the sale of adequately wired homes. (2) A set of 2 x 2 Kodachrome slides to be used in illustrating a talk on adequate wiring before builders' groups. (3) A celluloid ruler with cutouts in the form of the most commonly used electric symbols to facilitate the showing of electrical outlets on floor plans by architects and designers. (4) A series of folders presenting the story of modernizing old homes. (5) A set of 2 x 2 Kodachrome slides on the modernization story.

H. P. Wilson, Rock Island League—Wilson opened the subject of Home Planning Institutes which was then followed by a general discussion from all of the leagues which have conducted such a program. It was extremely interesting to note how this has spread over the entire nation since first presented to the leagues as a California program a year ago. The general pattern of the discussion followed closely after the method which we follow in putting on the Home Planning Institutes but there were a number of individual promotional ideas advanced which will be very helpful to us in our future activities.

J. A. Morrison, Philadelphia League—He pointed out that banks can only get from one to three per cent

on commercial loans and the only place where they can get up to six per cent is on small loans for residential modernizing. As a result of this viewpoint, the electrical league in Philadelphia has been very successful in interesting the banks in cooperating with them on a program of electrical modernization.

He presented a series of folders which had been prepared by the league and distributed by the banks and other financial agencies to their customers. Seventy-seven banks and home loan agencies have participated in this program and distributed 636,000 folders. The folders cost $10 per 1,000 to produce and the league pays one-half of this cost and the participating loan agencies the other half.

It is anticipated that the next step will be a modernization program in the commercial field.

At the close of the regularly scheduled program, there was a discussion of the Business Planning Institute activity and of the developments in the field of prefabricated homes. There was the same general interest in our activities in Business Planning Institutes as was manifest a year ago when we first announced our Home Planning Institute program.

The substance of the discussion regarding prefabricated homes was that there has been much more talk and publicity on this subject than actual accomplishment. None of the manufacturers have as yet progressed far enough with their plans for it to be possible to predict how great a factor this is going to be in the future residential construction field.

V. W. Hartley, PCEA—As an illustration of one means of pointing out to contractors the vast market which exists in the field of small commercial and industrial jobs, I presented the story which was prepared for our district meetings a few years ago and presented under the title of *The Question Box.* There was so much interest in the technique with which we had approached this subject that the secretary was instructed to send copies of the manuscript to all members and several present indicated their intentions of writing to us to order duplicate sets of the slides.

Norwood Craighead, Bendix Home Appliances, Inc.—Craighead gave a very splendid talk on salesmen's training. Among the points which he made were the following:

If industry is to provide the 50,000,000 jobs which have been assigned to it as a measure of our nation's prosperity, there is a tremendous selling job to be done and this responsibility can be met only by competent salesmen.

Twenty per cent of the salesmen sell 80% of the volume; therefore, these topflight salesmen are in great demand and a manufacturer must offer his salesmen something more than mere compensation if he is to hold him on his sales force. To meet this situation, Bendix develops what they term "Bendix religion" through which they imbue their sales force with a pride, not only in their selling ability, but also in the product which they are selling.

It is highly important to teach salesmen to qualify their prospects. He illustrated this by a story of the time that he went to a boat show and lingered lovingly around a $28,000 yacht. If the salesman had lacked the discrimination to realize that he was motivated by *desire* rather than the *ability to buy* the yacht, he might easily have been regarded as a good prospect and a considerable amount of time and expense wasted upon him.

In illustrating the need for regarding the customer's viewpoint, he used the story of the hardware dealer who realized that when a customer came in to buy a bit he was not actually interested in the bit itself but rather in the holes which that bit would produce in boards; therefore, the wise hardware dealer talked more about the round, smooth true hole which his bits would make than he did about the bits themselves.

He reviewed in complete detail the sales training program of the Bendix company which extends not only to their own salesmen but also to the sales forces of their distributors and dealers. After a careful analysis of all territories, they assign a definite quota of sales personnel to each distributor and in turn to each dealer, and when these sales forces have been built up they send their training men out into the territory to train them. If any of the men selected by either the dealers or distributors do not measure up to the standards which Bendix has set, they reserve the right to require a change in personnel.

W. H. Robinson, Jr., G-E, Lamp Division—The keynote of Robinson's talk was the necessity for intelligent selling of fluorescent lighting. He said that in present store lighting installations only 19% have been properly sold; the remaining 81% being completely undersold both as to quantity of illumination and quality of lighting fixtures. At least 4% of the present jobs should have four times or more illumination than they have at present.

Fluorescent lighting in the home means *in the kitchen* and customers should be urged to demand a minimum of two 40-watt lamps in properly designed fixtures. At the present time, he said, 7.6% of the kitchens of the nation have fluorescent lighting. Elsewhere throughout the home he looks upon fluorescent as being ornamental lighting or auxiliary to incandescent lighting.

The program of the lamp manufacturers is going to be built round the slogn "Look before you light."

A. H. Brolly, Station WBKB—The first two talks on Friday afternoon were combined into a joint presentation of AM and FM and television by A. H. Brolly and Seymour Minsk, substituting for Richard A. Graver. I gained the impression that television is still very definitely in the development stage. Friday night I went to a television broadcast at Brolly's station and this impression was further strengthened. It was quite apparent that television is today about at the stage reached by ordinary radio broadcasting in the early twenties. It is hard to see how it is going to find much of a mass market at the anticipated prices of the early sets. Without a mass market to appeal to the commercial sponsor, someone is going to have to pour tremendous quantities of money into the broadcasts during the experimental and development stage.

It was conceded by the speakers that unlike ordinary broadcasting where a set can be turned on and the program listened to while a woman is doing her housework, television will only appeal during that limited part of the day when the family can congregate in front of the receiver to sit and watch the pictures. This restricts the period of its use to a few hours in the evening.

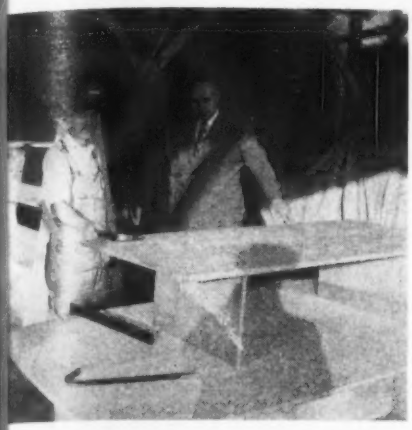
One handicap to both FM and television is the necessity for special antenna and special wiring to the point of use which means that these sets cannot be moved at random about the house.

● THE BUSINESS AGENT'S Division of the Los Angeles Department of Water & Power moved from its long-time location in the Homer-Laughlin Bldg. at 315 S. Broadway, to new quarters in the Washington Bldg., 311 S. Spring St. The entire sales promotional staff under Charles C. Snyder, business agent, including the residential section under R. H. Cockfield, and O. K. Buck, manager, industrial sales, and their staffs are on the sixth, seventh and eighth floors of the Washington Bldg.

● EXHIBITORS of housewares, lamps, giftwares and appliances at the Western Merchandise Mart, San Francisco, plan a spring *Portfolio of Merchandise Available* similar to those published in the past. Also in preparation is the *Mart Buyer's Book and Directory.*

Distributors are on the Grow

Expand facilities, organize sales personnel, hold trade shows, announce active programs



M. G. Sues, center, discussing with the carpenter, new display fixtures being prepared for use with future appliances

ALTHOUGH merchandise has been slow to appear, Western distributors of appliances have been busy preparing their houses for the time when it does start to flow through their establishments on its way to the dealers of the West. Many are building additions to their places, either for warehousing or sales and display; others are "reconverting" to make way for appliances after having been devoted to other lines for the duration; all are seemingly rearranging to incorporate new ideas in display and service to customers.

Among those whom ELECTRICAL WEST editors have contacted recently and where they have found interesting preparations going on are the following. Here too will be found reports of some of the recent shows manufacturers have staged in Western cities to announce their postwar lines and policies.

Sues-Young Co.

With quarters so ample for future expansion that during the war a large portion was sublet to a rug distributor and still left plenty of room for the Radio Television Supply Co., an affiliate of Sues-Young Co., the latter were making extensive preparations to expand both their appliance and radio interests. New department manager appointments were announced as a preliminary to the building of an ample peacetime sales organization to serve the southern California territory.

Sues-Young have 22,500 sq. ft. of floor area on Figueroa at 18th, in Los Angeles, handle Zenith radio, Thermador electric ranges, water heaters and air heaters, Coolerator electric refrigerators and home freezers, Speed Queen washers for eight counties, Regina Electribroom and floor polishers, Proctor appliances and Seth Thomas clocks.

With M. G. "Pete" Sues, for many years Los Angeles manager for Leo J. Meyberg Co., is Ed Young, who besides extensive banking experience was executive vice-president of L. J. Meyberg Co. also. Department managers just announced by them are: Jack McLennan, manager of the Zenith radio division. McLennon has been active in Zenith distribution for years. Joseph Wogan, manager of the major appliance division, was for some years with Easy and later factory representative for Speed Queen. Marshall C. Wells, manager of the traffic appliance division, was formerly with Westinghouse Lamp Division.

Westinghouse Supply adds a big appliance wing to its Los Angeles plant

The main sales floor is being rearranged to give more display area to the appliances, also to provide self service to the radio and television parts stock of the affiliate, Radio Television Supply Co. The Zenith department will have acoustically treated sound rooms on the main floor. Offices and a large sales conference room are being prepared on the mezzanine. The storage and shipping area in the rear, with truck entrance from two streets and a private parking lot, will be arranged for the most efficient grouping and handling of stock.

Westinghouse Supply

Burrell Manuel, vice-president of Westinghouse Supply Co., proudly shows the 30,000 sq. ft. addition to the Los Angeles house on East Second St., an addition that matches the present 50,000-sq. ft. building. This new concrete building, with two stories and mezzanine, facing the company's own parking lot across the street for customers and employees, will be devoted to the expanding appliance and radio part of the business and will leave the present building chiefly for supplies and offices. The lunch room for employees and locker rooms and lavatories, and the appliance division's offices will be in the new building.

While the main floor, with two large shipping bays, will be used mainly for appliance storage and shipping, the mezzanine along the front will contain the offices and a large display area for all appliances. The display room will have a small stage and be equipped with electric kitchen facilities for full operation. Separate rooms for radio, acoustically treated, will also be located there.

Front of the second floor will contain the service shop for appliances and radio and a service department office. The second floor provides further warehousing space at the rear. An elevator serves all this area, adjacent to the shipping bays. Access to the main building will be provided at each floor level. A spur track entrance at the rear on the main floor will permit direct unloading from freight cars.

Use of electric equipment is ample everywhere. Electric water heaters provide hot water and electric ranges cook the food. The entire plant is being well lighted. Electric wiring is being done by Bennett & Fosberg Electric.

Ground broken and work started at Gough Industries for a new loading warehouse with additional storage

Burrell Manuel also told of his organization to reopen this appliance phase of the business with the return of merchandise. W. W. Bell has been made district appliance manager, Walter A. Matzinger, the district apparatus and supplies manager, and William Gebhard has been made assistant district credit manager and J. H. McCarty district service manager. Likewise, the Salt Lake City and Phoenix branches of Wesco now have their headquarters in the Los Angeles house, which is the seat of operations for Burrell Manuel, vice-president for the entire West.

Gough Industries

Ground was being broken then and construction must be well nigh finished now on a new warehouse addition, an L-shaped building of 6,000 sq-ft. at the rear of Gough Industries group of buildings on East First St., Los Angeles. The supply business has grown so during the war that it has taken all the space formerly occupied by appliances. The new warehouse, with access to the spur track at the rear, will be able to handle four or five carloads a day. It will serve as a loading dock also for trucks.

Gough Industries made a big success of additional lines of furniture and housewares during the war and will continue in these fields but, as better quality furniture becomes available, this will be featured. The main appliance display will be at the present furniture display and warehouse building, although Jim Addis, vice-president, says that a representative display of merchandise lines carried will be kept at the main offices.

Lines to be carried and strongly promoted include all Philco products, L & H ranges and water heaters, Premier vacuum cleaners, National Sewing machines, Parsons Pureaire kitchen units (a packaged apartment kitchen containing either a gas or electric range, electric refrigerator, sink and cabinets), Clark water heaters, Youngstown kitchens, Speed Queen washers in San Diego County, and several lines of small appliances.

Several of Gough's men either in the armed services or loaned to them as technical experts, have returned, Addis said. Lou Walton and Bill Achilles, radio experts, were loaned to the government for radar work and have now returned. Back in the sales force are Al Hall, Tony Thompson and Bob Randall, all from the armed services. New men in the appliance and radio departments are Matty Matzenbacher and Vernon Charnley.

Fred Smith, an old timer in Phoenix, is handling the Arizona business of the company, where an office has been established in Phoenix.

In common with all Philco distributors, Gough Industries last month staged a one-day convention by film to present the Philco line and program for 1946.

Leo J. Meyberg Co.

Luckily L. J. Meyberg Co. had expanded into a separate building on Mission, near Tenth, in San Francisco to handle war manufacturing of radio equipment, for when its main office and warehouse burned out in a fire that left only the walls standing, what was salvaged was moved to the Mission St. building and from there business is going on as usual. True the offices are crowded and desks are close together and there are no private offices, but the business goes on until the main office building can be rebuilt. When it is, it will be larger, with two floors and mezzanine for the entire building, according to Bill Lancaster, manager of the San Francisco house.

Ted Malone, radio poet turned war correspondent, now sponsored by Westinghouse, stopped off in Los Angeles and San Francisco on his way back to New York from the far Pacific and was introduced by Charles Dostal, vice-president, to Westinghouse dealers and distributors in two interesting meetings. Malone recounted many human interest stories of U. S. men and women in the armed forces everywhere

Meanwhile the company is fortunate to have display space in the Merchandise Mart and so far not much merchandise has reached the Coast to be displayed.

The Los Angeles house of Meyberg Co., under L. E. Starkweather, vice-president and general manager and P. R. Buhler, general sales manager, is likewise undergoing some important changes to prepare for the return of its normal operations as an appliance distributor. The Standard Wholesale Co., which bought the wiring supplies department, was still operating from a portion of the main floor of the big Figueroa St. building, early last month, but was expected to move to its own building soon. Space it occupies will be needed for the forthcoming appliance displays.

Work was well started on big changes to both the radio parts and the record and radio departments. Larry R. Lange, division manager of the electronics division, which includes industrial sound, radio parts and systems, was inaugurating a most complete new self-help, self-service, cafeteria style arrangement. Dealers and industrial buyers will come in, help themselves to the parts they will find easily in group displays, pay for them as they check out on leaving. Much quicker service, plus a reminder of other parts needed when seen in the attractive displays, will result from this innovation.

When for three months the phonograph record volume surpasses that of other departments it can be considered a very important part of merchandising. Logically then preparing to streamline the service to dealers and to make room for the new RCA radios and combinations soon to come, this department, under Walter Stickel, is rearranging the flow of stock. In fact the department was being turned around so that records would flow in at one end and out the other in production line fashion.

Besides its three major lines, RCA-Victor, Norge and Bendix, the Meyberg Co. is California distributor for American Central line of steel kitchens, which includes dishwashers and disposals, the Domestic sewing machine, Eureka vacuum cleaner and iron, and several lines of small appliances. Table appliances will have a separate department under Harris Newmark, and really active merchandising of these appliances is contemplated.

Since Phil Doyle has become the new division manager for Bendix, A. R. "Tony" Combs, formerly field merchandising supervisor for the Southern California Gas Co., will head this department. Fred Lindquist is in charge of the Norge division and Walt Stickel of RCA radios, combinations and records. Already, intensified sales courses on Bendix have started and dealer presentations have been made on RCA.

Meyberg Co. has chosen to operate a so-called limited or selective policy with respect to franchises, rather than a mass policy. Whereas some may have

as many as 1,000 dealers in the territory, this company will have about 350. Franchises are limited in order to give each holder of one a chance to make money with it and have the incentive to build the volume. Each franchised dealer of either the appliances or the records will be expected really to feature and promote these lines. With records it must become a major business, not merely a makeshift sideline, for instance, for in many cases the territory assigned will be exclusive.

Nelson R. Thomas

It was a busy month for Nelson R. Thomas Agency, beginning with the visit to the West Coast of Joseph Gerl, president of Sonora Radio & Television Corp., for which Thomas is the Western factory agent.

Big meetings of dealers were held in Los Angeles, Oct. 31, and Nov. 2 in San Francisco to hear Gerl's message. Then he went to Portland Nov. 6, Seattle Nov. 8, for meetings with Northwest dealers.

Gerl envisioned the West as the future center of the radio and television industry, predicting that it would be a major manufacturing center. The real bottleneck in present production, he declared, was the lack of component parts. He said he felt the industry would produce a million radios before Christmas but could have turned out two and a half million had parts been available. The merchandising policies of Sonora, its advertising program and sales promotion, were also explained, and he declared that long discounts and high trade-ins would not build a stable industry.

Gerl also discussed problems involved in FM and television, saying he did not feel these to be immediate considerations. These will be worked out to the maximum benefit of the public, the broadcaster, manufacturer and dealer, he felt. In answering questions, to the one asked most insistently, "when?," he answered that samples would be available in November and that stock would begin to come soon after that. Asked about the new manufacturers in the field, he declared that all who build business on sound, ethical lines will be an asset to the trade; and that the others will strike themselves out.

The Thomas Agency represents Sonora in California, Arizona, Nevada, Utah, New Mexico and West Texas. It has offices in Los Angeles, San Francisco and Salt Lake City. It also represents Landers, Frary & Clark on Universal major appliances in southern California; Verd-a-ray Corp. in the eleven Western states; Dormeyer Corp. in southern California, Arizona, New Mexico and West Texas, and Grand gas ranges for eleven states.

The Los Angeles meeting was staged at the Ambassador by the Thomas Co., and the Pacific Music Supply Co., distributor, while that in San Francisco at the Sir Francis Drake, by the Schwalb-Lapkin Co., distributor in northern California.

Deepfreeze Meet

Frank Edwards Co. of San Francisco was host to the other distributors of the West for the regional meeting of Deepfreeze Products Corp. distributors, held in the Frank Edwards auditorium, Nov. 16, when G. H. "Rock" Smith, vice-president and general manager of Deepfreeze, F. F. Duggan, sales manager, R. V. Newbill, advertising manager, Service Manager Siebert, and Harold Bede, of L. Burnett Co. Inc., advertising agency, were present to present the line and discuss its potentialities.

Attending the meeting were: Wallace Campbell and Frank Hagenboth, of Northwest Appliance Co., Seattle and Spokane; H. E. Farris, Stubbs Electric Co., Portland; R. Emory Nelson and B. Ray Williams, General Sales Co., Phoenix; J. M. Jackson, Jackson Distributing Co., Salt Lake City; H. E. Sherman and Lou Swenson, Sherman-Swenson & Associates, Los Angeles; J. D. Germain, Moore Machinery Co., Los Angeles industrial distributor; and Frank Edwards and Lloyd Sutton and other executives and the sales organization of the Frank Edwards Co., San Francisco.

"Rock" Smith, former Hotpoint executive, told the group forcefully of the company's plans and sales program. The factory, he said, is making releases of a number of units for display purposes and is getting into full production. These display units are actual operating units and will be allocated immediately. For instance, in California the south coast district will get their samples first, then the Bay area, then the valleys and then more interior points. With these samples, the dealers of a district may arrange demonstrations and displays in local utility offices as a cooperative group.

The new postwar model of the Deepfreeze is now on display in the Frank Edwards Co. display at the Western Merchandise Mart.

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Apex

L. D. Stull, Western division manager for Apex-Rotarex Corp., has expectations of more than sample stocks soon, he says, if strikes do not stop steel production. Apex will have an automatic washer by spring. It will make two models of ironers plus one model designed to incorporate into kitchen cabinet, which will fold down when needed. It also plans to bring out a drier late next year or early 1947.

Stull announced some additions to his sales organization for the California territory. Roy C. Johnson, formerly with Dohrmann and Jackson Furniture, will work in the San Francisco and East Bay metropolitan district; Clay Smith, former Apex man, will travel both interior valleys; Harold D. Rice handles the Los Angeles metropolitan district and Don Flannes, formerly with Thor, the outside southern California territory.

Really planning for the future was Mr. Schedler, when he staked a claim on this piece of walnut grove near Lafayette, Calif., as the site for the future appliance store of his son, Bill, and son-in-law, Matt Connelly Jr., both of whom had "gone hunting in the Pacific"

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Atomic Power Plants—When?

JUDGING from some of the questions which have been put to scientists testifying before Congressional committees, the public power bloc is attempting to establish the fact that potential industrial applications of atomic fission will not make government hydroelectric plants uneconomic or obsolete. Neither research nor application has proceeded far enough to determine whether this will happen—either in five years or ever.

However, the eminent physicist, Dr. Arthur H. Compton of Washington University, in an article distributed by International News Service, has asserted that an efficient atomic power plant using superheated steam for driving a turbine could be put in operation within a year. Much research and development would be required to make such a plant an economical competitor with existing practice, he asserted. Aside from the headaches relative to controlling radioactivity, such an atomic power plant has certain attractions. He said in part:

"Prominent among the advantages of atomic power are the extraordinary low rate of fuel consumption and consequent low cost, wide flexibility and easy control of the rate at which power is developed and complete absence of smoke or noxious fumes. When completely consumed, the fission energy available from a pound of uranium is equivalent to over a thousand tons of coal. With the prewar price of uranium oxide at roughly $3 per pound and coal at $3 per ton, this would mean the economical use of uranium as fuel if only one part in a thousand of its available energy is used. Actually we should expect the first plants built to deliver atomic power to be considerably more efficient."

As a practical matter, the application of atomic fission to power production probably will wait for research with other cheaper and more plentiful elements than uranium. We do not hesitate to predict that it will come. A greater knowledge of metallurgy coupled with protective measures against radioactivity are the only obstacles in the way of a carbon-uranium power plant today.

However, in the meantime, there are other aspects of atomic fission of far greater social and humanitarian import than the production of power. The engineers and technicians in the electrical industry, who can truly appreciate the awfulness of the misuse of this discovery militarily, should do their level best to inform the average citizen of the tragic consequences of such misuse. It is calculated that the temperature of atomic fission of U-235 exceeds a million degrees Centigrade and that the resultant pressure front compresses air to the density of steel armor plate that travels with the speed of sound. The engineers, technicians and scientists must translate such technical facts as these into terms the layman can comprehend.

Otherwise there may be no world in which to apply the benefits of this discovery to the production of power or anything else.

Good News for Dealers

REA Administrator Claude B. Wickard's recommendation to rural electrification co-ops that they stay out of the appliance merchandising business will please a large number of appliance retailers. The possibility of these cooperative agencies employing the tax freedom and other privileges which they enjoy to engage in the retailing of electrical appliances has been a serious competitive threat to normal tax-paying appliance businesses.

"It is our belief that REA cooperatives will find it much more satisfactory in the long run to rely on local dealers to sell equipment and appliances if the dealers will provide adequate servicing," Administrator Wickard says. Undue financial risks due to lack of knowledge or experience in the business, the possibility of arousing antag-

onism and the resultant loss of goodwill and the fact that a merchandising department must stand on its own feet financially are reasons he lists for abstaining from the direct sale of appliances. "Co-operatives can and should work closely and impartially with dealers in their areas in utilization programs aimed at enabling members to make full use of electric power."

To which the whole appliance industry will echo, "Amen."

More Light for the Kitchen

ONE of the principal worries of the power companies is how to police the power factor of fluorescent lighting equipment. This is particularly true in the case of residential lighting, where it is possible that large numbers of uncorrected power factor may be installed. However, equally important, and largely overlooked, is the problem of insuring adequate capacity of the fluorescent equipment so as to obtain good lighting for the customer and at the same time produce the maximum revenue for the company.

By relating these two difficulties and seeking a common solution, there is an opportunity for some enterprising companies to overcome both difficulties at one time. The answer lies in a kitchen lighting campaign of the type which was so successful twenty years ago. The exception in this instance would be that the kitchen lighting unit would be a two-lamp corrected fluorescent fixture employing 40-watt lamps instead of a glass enclosing bowl housing a 100-watt incandescent lamp. If memory serves correctly, scores of thousands of the latter were sold at an approximate price of $7.95. Investigation shows that the type of fluorescent fixture suggested could be sold for approximately $12.50.

Unless steps such as those suggested are taken, it is more than likely that tens of thousands of kitchens will be equipped with uncorrected two-lamp fixtures using 20-watt lamps and selling for about $5.95. Obviously both the power company and the customer will suffer if this happens.

There is ample evidence to support the contention that both the customer and the utility would profit from the sale of the type of lighting equipment recommended. The General Electric lamp department has just recently surveyed thousands of typical kitchens to learn just how they are lighted. The average kitchen used 1.4 lamps of an average of 68 watts each or a total of 95 watts. Of all kitchens studied 55% were lighted with lamps of 60 watts or less and 45% with 100 watts or more. A single lamp was used in 72%. The type of home made little difference in the figures. In the top one-third of the income bracket 66% of the kitchens had one lamp averaging 84 watts. In the lower one-third 79% of the kitchens were lighted with lamps averaging 75 watts.

When a survey was conducted in 1944, it was found that 6.4% of the kitchens contained some fluorescent lighting. In the more recent survey this year 7.4% had fluorescent equipment, despite the fact that none was supposed to be available under WPB restrictions.

So there is a real opportunity for some successful kitchen lighting campaigns. Unless they are undertaken, it is conceivable that low-wattage uncorrected equipment will find its way into the majority of kitchens. With the life that is being built into fluorescent lamps, they will stay there for a long, long time.

DURING the war millions of man-hours were expended upon planning for postwar. Most of us did our best to foresee postwar conditions and problems and to plan for them. But now, in the early months of the postwar period, it is apparent that war-created maladjustments, and the uncertainty and confusion resulting therefrom are to continue to plague us for much longer than most of us had hoped. Any war entails terrific maladjustments for the peoples involved. World War II involved the whole world in the most destructive war of all time. It should not be surprising therefore, that the physical and mental confusions, the disturbance of human relations, the geographical and economic dislocations of the people within every nation of the world, and whether victor or vanquished, are the most severe the world has ever experienced. The momentum of most of the wartime forces is still with us. Demobilization is only well begun. Within the United States free-spending habits, cultivated and encouraged by the inflationary expenditures for foods and services consumed in the flames of war, are still resulting in abnormal demands on markets already suffering from serious depletion. Millions of working men and women still suffer from the dangerous delusion that wages can continue in time of peace, as in war, to be unrelated to the value of the work delivered. Government controls over prices and production still prevent the real revival of a free market for goods and services—Harry J. Bauer, chairman of the board, Southern California Edison Company.

Planning Meetings in Northwest

NWEL&PA sections, meeting at Butte and Portland, re-establish committees, outline spring programs

TWO important planning meetings were held by Northwest Electric Light & Power Assn. in November: Engineering and Operation Section executive committee in Portland Nov. 5 and 6, and the advisory executive council of the Business Development Section in Butte, Mont., Nov. 9 and 10. Each section reactivated bureaus and committees that were dormant during the war period and outlined programs for the spring meetings. The engineering group tentatively set its spring meeting for Seattle in early April 1946, and the Business Development Section decided on Portland, probably in May. Dates of both are yet to be confirmed.

The engineering executive committee met at the call of R. J. Davidson, Pacific Power & Light Co., chairman. Due to his temporary illness, it was presided over by L. R. Gamble, Washington Water Power Co., vice-chairman. One of the main decisions taken was to make a study of the effect of the house heating load on electric utility systems, and the incremental cost of serving this load. This study will be under the direction of O. L. LeFever, Northwestern Electric Co., chairman of the engineering planning committee, and will take the form of a series of studies by several different companies. Each company will estimate the effect of house heating on its system load, and will determine what will be the added cost per kva. in substations, transmission and distribution, to serve a hypothetical 10% saturation of this load.

In order to handle all the subjects suggested for study, the executive committee determined to re-establish five of its standing committees, which were dormant during the war. These, with their chairmen are: Power production, A. L. Pollard, Puget Sound Power & Light Co.; electrical equipment, J. Hellenthal, Puget Sound Power & Light Co.; transmission and distribution, C. H. Kirk, Montana Power Co.; utilization, John Bankus, Portland General Electric Co.; Code, S. B. Clark, Northwestern Electric.

Some of the subjects suggested for study were: Street and highway lighting, rural telephone by carrier, low-cost distribution substations, short-wave two-way radio for maintenance and construction crews, deferred maintenance, and forecasts of postwar load.

With J. M. McKay, Portland General Electric Co., section chairman, the advisory executive council of the Business Development Section and a few other key men in the sales departments of member companies met at Butte to reorganize the section into bureaus and committees and to outline the scope and work of these subdivisions, to be reported at the section's next conference. To accomplish this in the day and a half allotted to the meeting, two general sessions were held, with one afternoon devoted to meetings of subcommittees to consider separate phases of the general problem.

Of major interest was the report of the house heating committee, under H. C. Bender, Washington Water Power Co., chairman, as presented by R. E. Sinclair, Pacific Power & Light Co., and W. B. Bonnett, Puget Sound Power & Light Co., committee members. This report presented a house heating manual or handbook containing an explanation of the several methods of electric house heating, suggestions as to insulation, and charts and tables from which could be figured the maximum demand required for heating various sized houses in different climatic conditions prevailing in the territory, and the average number of kilowatt-hours required during a heating season. This manual was approved by the group and referred to the association executive committee for action as to the manner in which it should be produced.

The committee on water heater standardization, chairmanned by J. C. Plankinton, Northwestern Electric Co., reported certain companies as being willing to permit the NEMA-EEI standards of water heaters to be connected on their lines.

A. H. Wegner, reporting on behalf of the industrial development committee, explained a plan for establishing a research advisory service in the territory. The plan is under consideration by member companies.

Action taken on the reactivation of bureaus and committees is summarized as follows: Commercial and industrial sales bureau is to be established with O. C. Mayer, Idaho Power Co., chairman, and D. O. Bergey, Northwestern Electric Co., vice-chairman. It is to have a special heating committee with Albert Gruber, Washington Water Power Co., chairman; a commercial and industrial lighting committee, to include school and street lighting, with Hilbert Johnson, Portland General Electric Co., chairman. Occasional sales training conferences on commercial cooking and commercial lighting were recommended.

Residential sales bureau was reestablished with Guy Davis, Pacific Power & Light Co., chairman, and E. A. Olsen, Idaho Power Co., vice-chairman. The existing water heat-

Plankinton Huckins Wegner Kruse Jewell Leonard

Gamble Hellenthal Jones

LeFever Vilstrup Ashworth

ing and electric house heating committees were placed under this bureau and in addition an electric home committee, with H. N. Walters, B. C. Electric Railway Co., chairman, and a home service committee, with Lucille W. Ramirez, Washington Water Power Co., chairman, were revived. A new committee on adequate wiring was recommended, to be headed by J. F. McAllister, Utah Power & Light Co.

The rural sales bureau was re-established with Carl Dimmitt, Puget Sound Power & Light Co., chairman, and Cecil Root, Northwestern Electric Co., vice-chairman. This bureau is to function as a committee of the whole, and it was suggested that it should look into the possibility of producing a handbook on electricity in agriculture.

The advertising bureau was likewise reactivated as a committee of the whole, with Kimball Jack, Washington Water Power Co., chairman.

A new committee called "sales promotion" was authorized with the principal function of setting up a program at the spring meeting or otherwise, for the participation of manufacturers, distributors, appliance dealers and electrical contractors. This committee, which will be headed by Henry Kruse, Puget Sound Power & Light Co., will have on it representatives from all these branches of the industry.

The opening session of the conference was addressed by J. E. Corette Jr., vice-president and assistant general manager of Montana Power Co., who emphasized the importance of sales departments in perpetuating free enterprise and improving the standard of living in our country. The public interest must ever be the primary interest of the sales group, and attention to this public interest is the key to our success, Corette said. D. J. McGonigle, Montana Power Co., was chairman of local arrangements for the meeting, special events of which included a luncheon and a dinner.

● ELECTRICAL CONTRACTORS in Colorado have recently organized a new chapter of the National Electrical Contractors Assn., with headquarters at 217-18 Boston Bldg., Denver, Colo., and known as the Rocky Mountain Chapter. J. E. Collier, Collier Electric Co., was elected both the chairman of the chapter and its governor on the NECA board of governors. Pat Price was named secretary-manager and has begun the issuance of a semimonthly bulletin, which is both breezy and informative. Meetings are held the second Friday evening of each month. George Seaman, NECA field representative, assisted in organizing this newest chapter.

● GEORGE SEAMAN, National Electrical Contractors Assn. field supervisor, came to the West Coast Nov. 16, stopping first at Los Angeles, then San Francisco, to confer with chapter representatives in the selection of a field representative for NECA, Division 6, comprising the eleven Western States.

Russell Shepheard, technical service director. The Arco Co., Cleveland, presented a talk, *How Color Boosts Lighting Effectiveness*, at the Nov. 7 meeting of the Southern California Section, Illuminating Engineering Society. The Southern California Section is trying a new system of holding meetings without a dinner since finding of suitable dining places has proved quite a problem recently.

Johnson Bird Corette

Hogan McMicken Davis

McCammon Storey

RMEL Stages Postwar Conference

Program confined to discussion of immediate conditions, plans for industry's predictable future

ROCKY MOUNTAIN Electrical League's first postwar conference, Oct. 25, 26, 27, in Denver, bore all the trimmings of a prewar convention: Ladies, anchored at home since 1941 by patriotic and transportation considerations, came from the four states embraced by RMEL (Colorado, Wyoming, New Mexico and a portion of South Dakota), gowned for the social occasions which had thoughtfully been added by a thoughtful management to the business agenda. One utility executive banqueted and danced in tuxedo and wing collar, but other male members of the electrical clan felt *that* was carrying postwar propaganda a little too far—a sentiment not shared by their less industrial-minded wives.

An attendance roster revealed that every privately operated electric utility within RMEL's scope—and half a dozen municipals — were represented by top management personnel (probably an all-time record) besides each phase of the industry from manufacturers and jobbers to contractors and dealers. The order of business was just that, consideration, discussion and action on the immediate conditions confronting the electrical industry. The program confined itself so closely to the present situation and plans for the predictable future that engineering and accounting angles were not even scheduled. (A neglect that will be remedied by a spring meeting of these sections at Colorado Springs, where their interests will have exclusive attention.)

A thorough-going overhaul of labor relations, adequate wiring, electrical contractors, manufacturing, merchandising, technical manpower shortage and obsolence of generating equipment, was undertaken by such masters of the art as F. F. McCammon, RMEL president; E. S. Northrup, field representative, National Adequate Wiring Bureau; Dick Isaacs, Westinghouse Electric Corp.; Herb Names, owner of the merchandising firm bearing his name; James P. Logan, executive of the Colorado Employers Council, and Ashton B. Collins, father of Reddy Kilowatt.

President McCammon started the ball rolling with a tribute to the electrical industry: "The war was won on two major fronts by combat forces and industry (to supply the sinews of war and provide civilian needs). Since industry was powered by electric energy, which met every requirement imposed by urgent and ever-increasing demands, we may well feel that we've done a good job. The same ingenuity and energy that carried us through the war, giving more and asking less in return, gives us confidence to face the peacetime economy ahead."

Northrup "carried the ball" from there, outlining the vitally significant part adequate wiring will play in the reconstruction and reconversion era. He dilated on NAWB's elaborate promotional program, warning that home rehabilitation, construction of new housing, industrial and commercial enterprises are already under way and should engage the immediate interest of contractors, utilities and others whose future prosperity depends on a smooth flow of energy from source to the machinery and household appliances it services.

Ralph E. Johnson, member of the Sturgeon Electric Co., boldly characterized electrical contractors as the "bottleneck" through which (or whom) electrical energy must pass to properly service the many appliances and machines now in process of manufacture at factories; without adequate wiring and proper installation of motors, conduits and feeders, the best efforts of power companies, manufacturers, distributors and dealers will be largely nullified. Johnson proposed, as he did a year ago at a similar meeting, a coordination of architects, electrical inspectors, electrical contractors, building contractors and municipal authorities to insure the installation of wiring systems and materials capable of carrying the energy load safely at above-minimum-standard quality and workmanship. He proposed that contractors accept utility companies as allies, and urged the utility managers present to recognize their responsibilities to contractors by giving them moral and financial support with RMEL's scope of influence. He also recommended that contractors of the Rocky Mountain region be intensively organized under RMEL and hold an annual convention in which outside, nationally recognized talent be invited to participate as a league-sponsored event.

P. E. Brookover, rural development engineer for Public Service Co. of Colorado, cited that "virtual completion of the task of electrifying rural America is in sight," pictured for dealers a neglected field of opportunity in supplying farmers with (1) electrical equipment for milking, sterilizing, grinding feed, water systems, etc.; (2) appliances and radios, and (3) installations and servicing. He observed that electric merchandisers cater to the urban trade and have not kept their eyes on the fast-expanding rural market which, with private utility and REA development, promises rich rewards for earnest selling and honest service.

A chart exhibited by Dick Isaacs, Westinghouse Electric Corp., showed the approximate dates on which manufacturers' goods might be expected by dealer outlets; it represented a cross-section of information directly from the factories. Cabinets for electric kitchens, for instance, will not be available in quantity until July 1946; electric dishwashers, refrigerators and disposal units will not be deliverable until some time after the Christmas season; the heralded clothes driers and automatic washers will be in dealers' display rooms, as samples only, until about the third quarter of 1946, when

Northrup Hubbard

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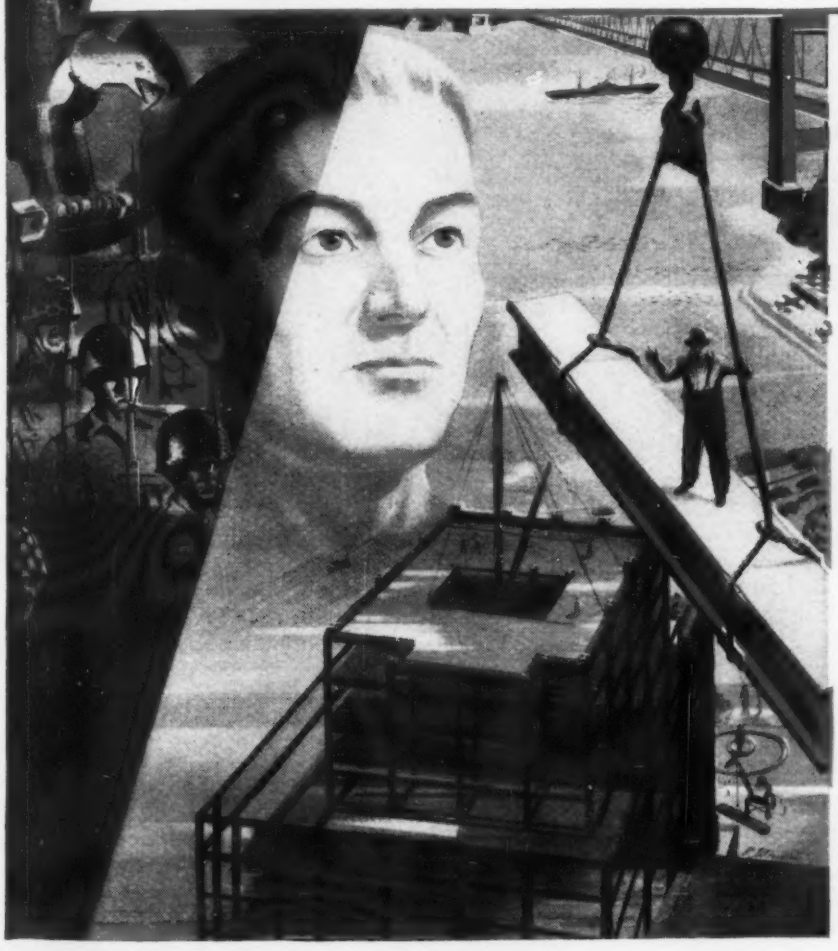

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ROEBLING

PACEMAKER IN WIRE PRODUCTS

production will begin to catch up with demand. More hopeful was the chart's prediction on electric clocks, electric blankets, convection heaters, vacuum cleaners and radios, which will be in the market by December 1945, or shortly after. The harvest, Isaacs indicated, is not yet, but soon.

Names, the perennial optimist (who seldom misses a guess, and when he does, profits by same), offered statistics: 6,000,000 marriages in U.S.A. since 1940; a birth rate of 2,000,000 annually—and the mating season will not really start until 8,000,000 service men are demobilized! All of these people, including babies, are potential customers for electrical dealers. The market is unlimited and expanding for the progressive merchandiser who sells reliability of his store and top-drawer service. Names recommended that distributors sell only to permanent and reputable outlets; regretted that utilities are withdrawing from the retail merchandising field ("they pioneer, promote and provide public acceptance for the dealer's benefit"); and announced that he plans to concentrate his furious selling energy on driers, ironers and automatic washers, thus placing himself outside "chain store" competition and establishing a substantial clientele that will rely on him for service.

The address by James P. Logan, chairman of the Colorado Employers' Council, advocated that labor be endowed by law with responsibility and obligation on a par with those of capital and management; thus, he said, a violated contract would involve a collectable penalty. Logan deprecated compulsory arbitration as an artificially erected barrier between labor and management. Strikes and lockouts are no cure for industrial quarrels, he declared, and the only remedy lies in the disputing parties settling their differences face to face.

Ash Collins, not even referring to Reddy Kilowatt, discussed *What the Utility Customer Expects From You,* demonstrating with blown-up photographs the different types of electric consumers and their appraisal of the electrical industry. Some were not favorable and expected too much; others were more moderate.

At the conclusion of the second day's deliberations, Luke R. Storey, vice-president and general manager of the Greeley, Colo., Home Gas & Electric Co., was elected president, taking office immediately, as did vice-presidents: W. D. Johnston, Mountain States Power Co., Casper, Wyo.; F. H. Wiley, Colorado Springs Light & Power Department; M. C. Heffelman, New Mexico Power Co., Santa Fe, N. M., and A. S. Anderson, General Electric Co., Denver.

The utility managers' meeting, Oct. 27, developed a comparison of notes on results of Colorado's newest and most satisfactory law applying to public utilities, passed by the last legislature. Since this interesting piece of legislation constitutes news, it is reproduced here in full:

No cooperative electric association or non-profit corporation or association shall render electric service in territory already served by electric public utilities, whether the latter be municipally or privately owned or in territory which can reasonably be served by an existing public utility and in which territory such public utility does actually construct lines and agree to serve consumers promptly and within a reasonable time, unless a certificate shall first be obtained from the (Public Utilities) Commission that such service is in the public interest; provided, however, that nothing herein shall require discontinuance of service to consumers to whom service has heretofore been rendered.

This provision has been responsible for amiable collaboration between electric utilities management and REA officials. With one exception, agreements concerning territory to be exploited have been reached without recourse to dispute. Where areas desiring electric service are outside the realm of intelligent extension for privately operated companies they have yielded to cooperatives; in return REA units do not invade regions now serviced.

Pension Plan

With a proposed pension plan to assist the International Brotherhood of Electrical Workers in salvaging its pension system as the principal contention before the National Electrical Contractors Assn. convention at Cleveland late in October, the Pacific Coast delegates to that convention returned to discuss its meaning with their constituents. The controversial pension program was referred back to the members of the IBEW Employers Section for a final decision by letter and chapter ballot.

Considered by the Westerners who attended the convention to be the most important question before the NECA, several expressed the feeling that it could not be supported by Western chapter groups.

The plan would assess a 1% labor pay roll tax on all contractor members, which fund would be turned over to a joint pension board of the IBEW and NECA, to supplement that obtained by assessments to the membership of IBEW for its own pension system. With large increase in membership and the nearing of retirement age of a large force of members, the IBEW pension fund is insufficient to take care of the drain upon it.

Western delegates to the convention questioned whether electrical contractors, who only employ 30,000 out of a total of 150,000 of IBEW members, could support the demand upon this fund sufficiently, when Chicago and New York associations and IBEW joint pension programs require from 5 to 6% of the pay roll. It was doubted whether contractors, with this additional burden on the pay roll, would be able to compete with industrial plants employing electricians at lower scales of wages than those paid by contractors. The matter is to be voted on before Dec. 31 and ballots have been sent to all members.

NECA Expands

NECA has ambitious plans for 1946, those who attended the convention report, and has added several staff officers and intends to add a technical research director who will be an expert on Code and cost data matters. The formal papers presented are reproduced in *Qualified Contractor,* official organ of the NECA.

A resolution was passed recommending that traveling members who operate in areas covered by other chapters than their own, pay a portion of their dues to such chapters for the work done in those areas.

T. L. Rosenberg, Oakland, was elected vice-president for Division 6, comprising the eleven Western states succeeding A. L. Stone, of Los Angeles. Attending the convention from the West were A. L. Stone, J. B. Shamel and Warren Penn, of Los Angeles; T. L. Rosenberg, Oakland; J. D. O'Connor, Sacramento; George Abbett, San Francisco; Grover Burke, Seattle; H. A. Smith and Paul Heydon, of Spokane.

The convention gave approval to a tentative proposal to hold its next convention at Colorado Springs, Colo., next fall.

● R. B. LANE of the Industrial Electric Co. has been named president of the Seattle Electrical Contractors Assn., succeeding Frank Holert of Holert Electric Co., second vice-president of the Electric Club of Washington. Cal Brauner, Puget Sound Electric, was named the new vice-president of Contractors, and Charley Meagher, Mars Electric, was renamed secretary-treasurer. Grover C. Burke, City Electric & Fixture Co., was named a trustee, serving with Van S. McKenny and Frank Holert.

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NEWS of the industry

CO-OP SELLS OUT TO IDAHO POWER COMPANY

Idaho Power Co. last month took over electric properties of the Jordan Valley Electric Cooperative in eastern Oregon, following almost unanimous vote by co-op members to sell to the private company. The transaction is said to be the first in the United States in which an REA-sponsored co-op has been acquired by a power company.

The Jordan Valley co-op was formed in 1940 and was operating with a diesel generating plant. According to V. P. Laca, president of the co-op, rates have been approximately 30% above Idaho Power schedules and, after more than five years of operation, cumulative results show that the association has not had sufficient earning to take care of its loan payments after operating expenses, without allowing anything for depreciation or replacement of the property

Continuing his statement, Laca said: "The directors came to the conclusion that the continued operation of the property was not economically feasible and could only result in further losses under present circumstances. They requested and obtained from Idaho Power Co. an offer to purchase and take over the system at a price which would enable the Jordan Valley Electric Cooperative, Inc., to pay its loan in full to the Rural Electrification Administration and all other indebtedness.

"In that Idaho Power Co. has agreed to extend rural lines both to the west and southeast of Jordan Valley and to make service available at the uniform Idaho Power Co. system rates, we feel that we have made the proper decision, for in the final analysis what we desire is adequate and reliable electric service to meet the growing demands of the territory."

Already serving 90% of the farms within its service areas, Idaho Power Co. recently scheduled an expansion program, which will take electric service to the few remaining unserved rural communities in its territory. Details of this program were announced recently by President C. J. Strike.

Pointing out that the American people have expressed their desire that all agricultural people have the benefit of electric service, Strike expressed the belief that this service can be most economically furnished by the agency serving urban business in a particular geographical area.

All Idaho Power district managers have been authorized to proceed with necessary preliminary steps, using a ratio of six dollars to be invested in facilities for each dollar of prospective annual revenue. The company's previous rural extension policy had been on a 4½ to one basis.

B. C. Electric Take Over Breaks Down on Financing

Negotiations for purchase of B. C. Electric Railway by public agencies broke down last month, when the nine-man steering committee representing lower island and mainland municipalities voted unanimously against a plebiscite on the plan. The vote, which rescinded earlier approval of the plebiscite by delegates from 31 communities, was taken after Premier John Hart had stated that municipalities must guarantee financing bonds.

Plans to take the proposal to the voters at mid-December elections followed more than two years of negotiations between the provincial government and municipalities in the area served by the power company. Government stand on financing had been termed vague and a last-minute telegram to Premier Hart from a member of the steering committee asked for clarification. Hart replied that cities must set up commissions to make provision for financing the operations. These commissions would have the power to borrow, he said, but as there is no assurance they could raise necessary funds, municipalities must give guarantee.

Members of the steering committee were quoted as stating that the purchase plan cannot be revived unless the government agrees to underwrite the financing.

In commenting on the committee's action, Hart stated that the government is not making further moves. "The decision was up to the municipalities. At long last they have made it," he said.

● STATING that it is a potential customer for 75,000 kw. of Shasta power, Sacramento Municipal District recently asked the House appropriations committee to make available funds for government-owned lines to transmit the energy throughout northern California. Litigation still surrounds the district's attempt to acquire PG and E properties in the district, with a utility appeal against the $11,632,000 condemnation award pending in district court.

PUGET POWER WILL GET FIRM OFFER, MYERS SAYS

That firm offer, accompanied by evidence of ability to finance, would be made to Puget Sound Power & Light Co. within 30 days, was the prediction of Guy C. Myers, fiscal agent for PUDs seeking to acquire the properties, following last month's reported breakdown of negotiations.

He stated that snags in the original plan were being ironed out, and said he expected company stockholders would be given an opportunity to vote on acceptance or rejection of the purchase within 45 days.

Admitting that Snohomish and Whatcom PUDs had declined to participate in the purchasing agreement without further evidence on situations affecting their respective interests, he said that both districts were awaiting the report of an independent engineer.

Utility Acquisition Aim of Public Power Corporation

With the announced purpose "to acquire the Oregon and Washington properties of Pacific Power & Light Co. at a fair price," Interstate Electric Inc. has been formed as an Oregon non-profit corporation. Each stockholder in Interstate represents a local public power organization operating in territory now served by the power company.

At a preliminary meeting held in Pasco, Wash., a spokesman for the new group pointed out that SEC had ordered American Power & Light Co. to sell its stock in Pacific.

Charles Baker, officer of Pacific Cooperative Supply Co., Walla Walla, Wash., was elected temporary chairman of the organization. Headquarters will be in The Dalles, Ore.

● EFFORTS of the Whatcom County PUD at Bellingham, Wash., to finance purchase of Puget Sound Power & Light Co. properties in that county have met with "insurmountable obstacles," according to State Auditor Cliff Yelle. In an examination covering the PUD's records from its inception in 1937 to Dec. 31, 1944, Yelle said that the district had taxation receipts of $198,907.92 and expenditures of $172,586.57. General expenses have been low; expenditures were mainly for appraisal and condemnation.

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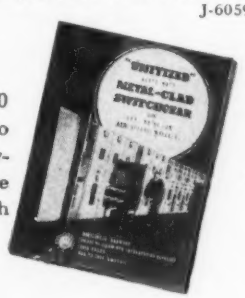

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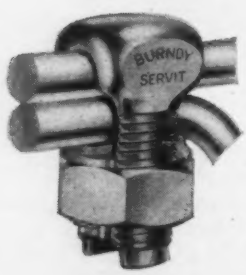

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ROBINSON TESTIFIES AT INQUIRY INTO TAX LOSSES

Tremendous growth of public power during the last decade was laid to the "great increase in the value of the special privileges" it enjoys by Kinsey M. Robinson, president of Washington Water Power Co., in testimony before the House securities and exchange subcommittee, inquiring into federal tax losses through capitalization of taxes in sales of utility property into public ownership under the holding company act.

Chief of these special privileges, he said, is exemption from taxation and, after showing increase in value of this exemption as a result of growing tax burdens on privately owned companies, he warned: "Unless Congress does something about it, I foresee complete socialization of the electric power industry."

Agreeing that federal multi-purpose projects frequently are worthwhile enterprises, Robinson pointed out that there is no reason for destroying an industry which pays more than $700,000,000 in taxes directly and is responsible for another $200,000,000 indirectly in taxes, just to get the advantages of multi-purpose dams.

He cited 27 special privileges enjoyed by public power operations and divided them into three types: (1) Subsidies and rebates; (2) freedom from the workings of economic and business laws; (3) advantages of being part of government. These special privileges have always been enjoyed by public power, he said, but until about a decade ago, the relation between public and private power was relatively constant.

"The taxpaying utilities have been subject to severe political attacks in recent years," he stated. "It has seemed apparent to many of us that a well-directed attempt, backed by political power and financed by public funds, is being made to socialize the electric utility industry. These assaults could not, in themselves, have been effective without some economic advantage of sufficient weight to enable public power to present itself in a favorable light to the public."

Freedom form taxation, particularly federal taxation, is the greatest of these special privileges, Robinson told the committee. As an example, he cited the Bonneville Power Administration which, as of June 30, 1944, had a plant account of $337,811,494, which compares with total plant account of $325,939,615 of Washington Water Power, Puget Sound Power & Light, Pacific Power & Light and Montana Power companies. Taxes paid by the four utilities, he pointed out, totaled

$27,487,990 in 1944, or more than 30% in excess of the total revenues from Grand Coulee and Bonneville power sales.

"In 1944," he added, "Washington Water Power Co. paid taxes averaging 2.32 mills per kilowatt-hour sold, whereas the total revenues of the Bonneville Power Administration averaged but 2.49 mills per kilowatt-hour sold."

Robinson made similar comparison for the TVA with three groups of adjoining utilities with similar total plant accounts and power sales. He also pointed out that utility operations are responsible for a second, but less well recognized, form of tax revenue in the form of income levies on their bond interest and dividends—a tax from which public power investment holders are exempt.

Rural Cooperative Group Holds Northwest Meeting

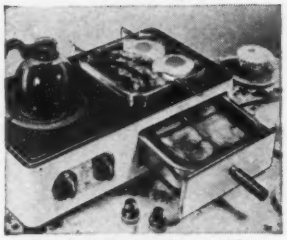
Northwest members of the National Rural Electric Cooperative Assn., drawing delegates from Washington, Oregon, Idaho, Montana, Nevada and Utah, met in Spokane recently and voted at that time to do all in their power to bring the 1947 national convention to that city.

The group also endorsed the Columbia and Missouri Valley authorities; endorsed the Poage bill; passed a resolution asking the national association to press for continued government construction of transmission lines and advocated the use of two-way radio in REA operation.

John M. George of Culdesac, Idaho, was re-elected national director from the six states. Carl Moore, Colville, Wash., was conference secretary.

E. J. Stoneman, Platteville, Wis., national president of NRECA, and Bonneville Power Administrator Paul J. Raver were speakers. Declaring that "there is room in America for both private and public power distribution systems, Stoneman forecast a great amount of work for both in the next ten years. Raver stated that rural electrification alone can absorb in the next few years more than a fifth of the power load lost when war plants closed; said that Bonneville is preparing to meet rapid expansion of the market for electrical energy.

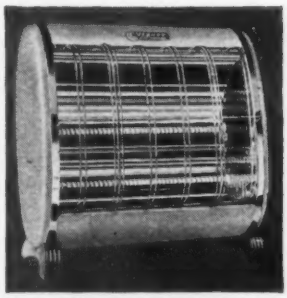
● ARRANGEMENTS have been completed between Okanogan (Wash.) PUD and Bonneville Power Administration for delivery of power to Okanogan County from Coulee Dam. A new 115,000-volt transmission line will be built to Brewster in Okanogan County, according to Paul Hand, manager of the PUD. Construction of the line is slated for completion Aug. 1.



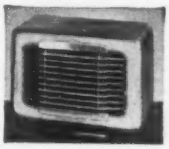
Everhot Rangette provides complete cooking facilities for millions who live in small or temporary homes.

Everhot Roasterette cooks all kinds of casserole meals and dishes.

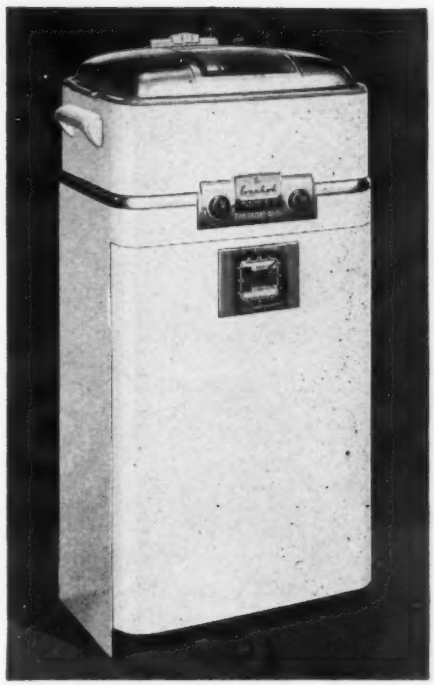
Everhot Kook-R-Jug both cooks the meal and keeps it hot for hours outside the home.



Everhot Rayvector Room Heater is readily convertible for both radiant and circulating heater.



Everhot fan-type heater is a circulating unit of amazing efficiency.



The well-known Everhot Roaster is completely re-designed. It now embodies features never before available.

ADVANCED ENGINEERING, up-to-the-minute styling plus years of experience in designing and manufacturing electrical appliances and insulated electrical cooking equipment of all kinds, combine to make this Post-war Everhot line of outstanding significance to the appliance trade . . . Here are long established, fully proved, well-known Everhot quality and dependability in units of startling beauty and extraordinary performance.

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TRUMAN LETTER INDICATES STAND ON AUTHORITIES

President Truman will not throw his weight behind any congressional measure to establish authorities for the administering of the West's water resources.

This interpretation was placed on Truman's message, delivered to the National Reclamation Assn., which held its annual convention in Denver Nov. 15 and 16. The communication was read to delegates by Ora Bundy, president of the association, and was hailed as a pronoucement by the chief executive that he favors the handling by Army engineers and USBR of flood control, irrigation and power projects on a grand interstate scale.

The Truman letter read in part: " . . . The circumstance of which I speak is the knowledge of how much can be gained through coordinated management of the resources of our great river valleys . . . In a recent address . . . I pointed out that the underlying common-sense principles of the Tennessee Valley experiment could provide guidance and counsel to the people of other regions, who likewise aspire to put their resources to the greatest use; but I emphasized that the form such development will take in any region was for the people of that region to decide.

"The Bureau of Reclamation is now working on plans for the coordinated development of sixteen river basins of the West, reports on which will soon be made to me and to the congress, that will provide basic data for river basin planning."

The conclusion drawn from Truman's statement by chiefs of the Bureau of Reclamation and principal association delegates, who represent virtually every agricultural and reclamation interest in the West, practically all of whom are opposed to authorities, was that, without the President's active approval, authority legislation will be defeated.

Bundy said the President's pronouncement, that the regions affected shall determine methods of development, gives hope to those who fear that the power of the federal government may be directed toward exploitation of river valleys through authorities.

● CITY OF CHELAN, Wash., will seek legal opinion on whether it can take steps to acquire Washington Water Power Co. facilities within the city, in spite of a prior filing of condemnation proceedings by a Public Utility District. City voters approved a measure to acquire the properties at its recent election.

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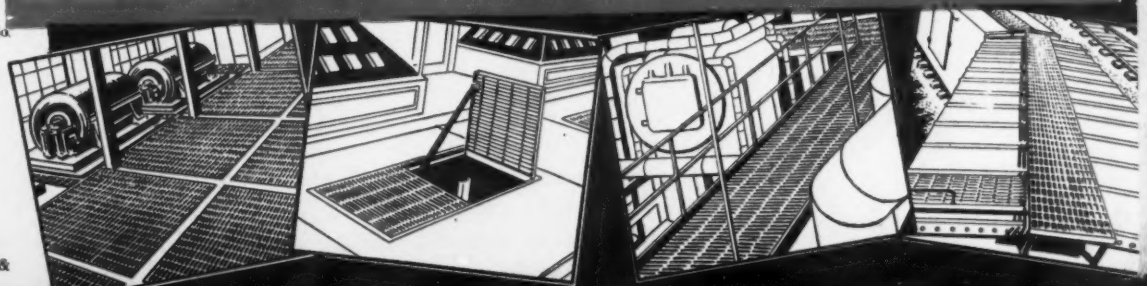

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AUSTIN LEVELING BRIDGE FOR SWITCHES AND RECEPTACLES

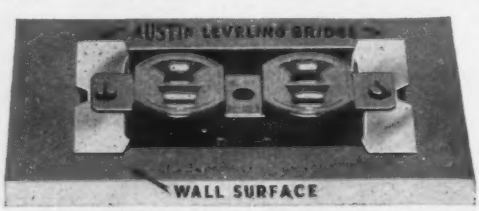
No. 1941

Here is a very inexpensive device that saves time and eliminates all the troublesome problems of leveling switches and receptacles with the surface of the finished wall so that the plates fit perfectly.

It positively eliminates broken or distorted plates and loose switches or receptacles. It is very common to go back to the job to mount the switch or receptacle plates only to find that the box is setting a bit crooked or it is too far back from the wall so that the receptacles do not line up with the plates. The Austin Leveling Bridge completely overcomes this problem.

It rests on the surface of the finished wall and the screws for the switch and receptacle pass through it and into the ears of the switch box. Therefore the receptacle is in perfect alignment for the plate. Ideal for concrete jobs where the boxes seldom come flush.

No matter how far back or how crooked the box may be the Austin Leveling Bridge makes every switch or receptacle fit perfectly with the plate and every plate fit perfectly on the wall. Made for single or two-gang outlets.



Above illustration shows a duplex receptacle mounted on the Austin Leveling Bridge. Note:—Receptacle is flush with wall surface and in perfect alignment for the plate.

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Austin Cat. No.	Type	Wt. Lbs. Per 100 Sets	Carton	Standard Package	NET PRICE PER 100 SETS Less Than 100 Sets	100 to 499 Sets	500 Sets and Over
1941	Single Gang Bridge .	3	100 sets	500 sets	$2.05	$1.75	$1.55
1942	Two Gang Bridge	5	100 sets	500 sets	4.10	3.70	3.35

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UTAH POWER REORGANIZATION GOES TO DISTRICT COURT

Reorganization of Utah Power & Light Co. was to be discussed at a hearing in U. S. District Court at Salt Lake City on Dec. 19. Approved by SEC, the reorganization plan cancels existing common stock and places full ownership and control with preferred stockholders. Major provisions are:

1. Cancellation of 3,000,000 shares of common stock and 2,100 shares of preferred stock held by Electric Power & Light Corp., and the payment of $650,000 to Electric for cancellation of its stock and certain claims.

2. Relinquishment of any claims existing between Electric and UP&L.

Company officials at Salt Lake City said this plan clears the slate as of Dec. 31, 1944, leaving all net income earned since Jan. 1, 1945, for earned surplus out of which dividends may be declared on the single new class of common stock to be issued. This common stock would have no par value but a stated value of $20 to exchange for all outstanding preferred stock on a basis of 4⅞ shares of $7 preferred and 4⅜ shares of $6 preferred.

About half the preferred stock is held by 7,500 persons in Utah, Idaho, Colorado and Wyoming, the territory served by the company, according to George M. Gadsby, president of the company.

● FPC has directed Pacific Power & Light Co. to comply with its order of Oct. 27, 1942, specifying accounting procedure for Ariel Dam on the Lewis River, Wash. A stay of certain requirements, granted at the request of the company, was dissolved in the new FPC order. Ordered removed from the accounts were $354,784, representing associated company charges and fees of Electric Bond and Share and Phoenix Utility Co., disposition to be effected by charge to earned surplus. The commission set original cost of the project at $8,202,982 and disallowed amounts totaling $488,222.

● WHAT IS HOPED will be the final hearing in the reorganization case of Portland Electric Power Co. has been set for Jan. 2 at Portland, by United States District Judge James Alger Fee. One of the major proposals under consideration in the reorganization case provides that stock of Portland General Electric and Portland Traction Co., Pepco subsidiaries, shall be sold and the proceeds distributed among the stockholders. Previously it had been suggested that a new issue of stock be distributed to stockholders.

NEW RATES ENCOURAGE ALL-ELECTRIC HOMES

New residential rate schedules designed to encourage "all-electric homes" have been put into effect by Portland General Electric and Northwestern Electric companies, following approval by Oregon and Washington regulatory bodies.

The schedules will save PGE customers in seven northwestern Oregon counties about $338,000 annually. Oregon and Washington customers of Northwestern will save about $125,000 annually.

Minimum use for which the rates will be applicable will be in homes with electric ranges and water heaters. An estimated 15% of PGE residential customers and 15 to 20% of Northwestern users will qualify at present.

A flat minimum of $4.50 for the first 300 kwh. ($5 in rural areas) is provided, estimated saving in this category being 20%. Rate for the next 700 kwh. is six mills per kwh. and for all over 1.000 kwh., 8½ mills per kwh. Special phases of the new schedules are applicable to house heating.

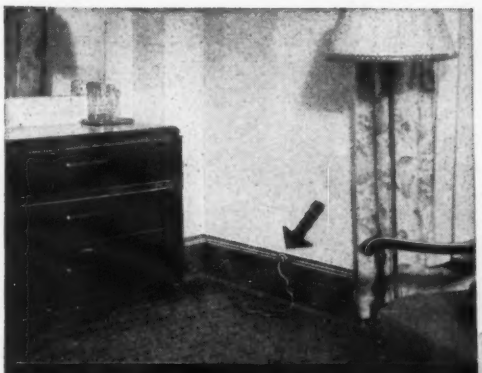
Pay Increase Granted Puget Power Employees

A 15% pay increase for 1,800 Puget Sound Power & Light employees has been granted under wage agreements between the company and the IBEW, Local B-77. Restoration of the 40-hour week for 2.000 members of the local, who signed for the 48-hour week in 1944, also was announced by the company.

The pay increase will go to 600 clerical and 1,200 production and maintenance electrical workers. It calls for an immediate 3½ cent raise to employees on an hourly basis, and $6 a month more for those paid on a monthlv basia, retroactive to July 16. The balance of the 15% increase will become effective as the employees return to the basic work week.

Cowlitz and Pacific County PUDs had agreed to meet the Puget Power wage scale and Grays Harbor PUD commissioners were considering similar action last month.

● Colorado River Commission of Nevada recently approved a request of Clark County Overton Power District for 500,000 additional kwh. from Boulder Dam power plant. Overton at present is supplied with 2,500.000 kwh. of Boulder power annually. Final action on the request is expected soon by the Department of Interior which will set the date withdrawal of extra power is effective.



Wiring for convenience and economy of maintenance in hotel rooms requires ample outlets, properly placed, for floor, desk and bed lamps . . . fans and appliances . . . located with special regard to the comfort and safety of guests. This photograph shows how Plugmold, installed above the baseboard, is being specified for this purpose by an increasing number of hotel operators.

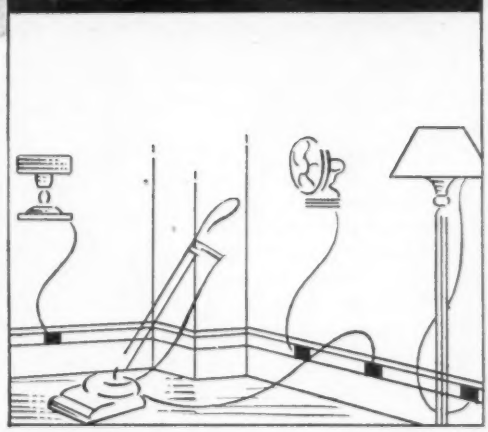
WHERE TO USE IT . . .

What to use -

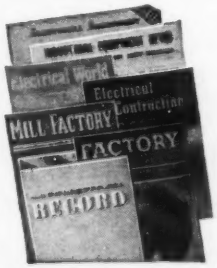
PLUGMOLD

No. 2100 Plugmold—Capacity: 6 No. 12 R.C. Conductors with receptacles installed; 10 No. 12 R.C. Conductors without receptacles.

HOW TO USE IT . . .



Diagrammatic drawing shows typical installation of Plugmold No. 2100 in hotel rooms. Outlets may be located exactly where required and in the number required for adequate service. When redecorating or re-arranging rooms the location of outlets or the number of outlets may be changed without disturbing the basic installation . . . making Plugmold an extremely economical long range investment from the maintenance point of view, eliminating hazardous long extension cords and the pilferage of plugs and accessories that has in the past proved a costly item.



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BONNEVILLE, B. C. HOOKUP GIVEN PRESIDENTIAL OKAY

President Truman has signed a permit which authorizes the Bonneville Power Administration to construct and operate transmission facilities at the Washington - British Columbia border to deliver power to the B. C. Electric Railway Co.

This action gives final approval to the contract executed by Bonneville and the Canadian company calling for delivery of 22,000 kw. of Columbia River power to alleviate a shortage in the Vancouver, B. C., area, pending completion of the Bridge River project in British Columbia.

The Bonneville Administration has awarded a contract to Goetz & Brennan, Seattle, for clearing the right-of-way for a 71-mile, 230,000-volt wood-pole line from Arlington to Blaine, Wash., on a bid of $440,320. The line will be connected with one to be constructed by the company from the border to Vancouver. Completion is scheduled for late in 1946.

Transmission Loop Part of CVP Supplemental Request

A budget item of $6,065,000 for construction of a 375-mile transmission loop to carry Central Valley power is included in the $18,500,000 supplemental appropriation request for the project to July 1, 1946. The line would extend along both sides of the valley from Shasta and Keswick dams to the Delta.

An item of $1,600,000 was included to continue work on Shasta switchyard and to initiate work on the Keswick switchward and two switchyards north and south of Sacramento. Other items are: $850,000, Shasta Dam and reservoir; $7,500,000 initial construction on the Delta-Mendota canal; $349,420, additional work on the Delta Cross channel; $200,000, Friant Dam and Millerton reservoir; $885,580, Shasta power plant; $1,050,000, Keswick Dam; $197,000, surveys in connection with Pine Flat development, Kings River.

Columbia Basin Requests Additional Allocations

Supplemental funds totaling $1,000,000 for the fiscal year have been requested for the Columbia Basin project and, if allocated, will bring the 1946 appropriation to $19,474,000.

Included in the work for which funds are requested are four earth-fill dams, a pumping plant and irrigation works near Pasco, Wash.

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TYPE VB BATTERY CHARGING VOLTAGE REGULATOR

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Write for bulletin

CONTROL CORPORATION
600 Stinson Blvd.
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CONTROLLED ATOMS or CONTROLLED LIVES

SINCE August 6th when the first atomic bomb was released over Hiroshima, the American people have been subjected to a continuous barrage of pronouncements on the use and control of atomic energy. Some of this comment has been strident, and much of it conflicting. A considerable portion of it has been of sincere and constructive excellence.

It has not been easy to separate the wise counsel from the merely noisy, and it is small wonder that the minds of many are troubled and confused.

However, the sheer mass of discussion poured into press and microphone has awakened us all to the gravity of the issue. In terms of any problem on which Americans ever have been called to exercise a judgment—This is It!

Even the dullest now recognizes that atomic weapons hang over modern civilization like the Sword of Damocles, and understands in some measure how fragile and taut is the hair of political balance that holds it suspended.

From this point on, we need the coolest and most carefully considered judgment that can be brought to bear. Discussion highly charged with emotionalism will but increase the tensions both at home and abroad, and render wholly insoluble a delicately intricate problem.

What Is The Problem?

The major outlines of that problem now are coming into focus in understandable terms:

1. The scientists have opened up a new and virtually unlimited storehouse of energy, and the engineers have discovered how to turn it into a military explosive incomparably more powerful than any we have known. We know that this energy may also be used to produce heat for useful power, and we suspect that the radioactive substances produced by the process in hitherto unimagined quantity may also have medical, industrial, and other constructive applications.

2. Terrifying as have been the demonstrations of the atomic bomb thus far, we know that they are as nothing in comparison with its potential destructiveness. The explosive force of individual bombs can be increased tremendously, and means for their effective delivery to predetermined targets in wholesale quantity already are at hand. The experts tell us that no practicable means of interception can be devised, and that reprisal in kind probably will be the only answer to an enemy attack with atomic weapons.

3. So far as we can see now, even successful retaliation would be at best an answer of hollow effect. Any two nations each having wholesale stock-piles of bombs could accomplish the practical destruction of each other. Since a first treacherous blow might well constitute an enormous advantage, a nation actuated by a ruthless urge to conquest or revenge might have the best chance of survival. But since the widest possible dispersal of bombs and launching units would be dictated by the strategy of atomic weapons, it is doubtful that one nation could destroy another without itself suffering destruction. On both sides the major centers of population could be wiped out, and the nation of least concentrated industrialization and commerce would suffer least. However, no one can be sure that the concentrated explosion of as many as 20 thousand atomic bombs would not poison the atmosphere of the world to an extent that would be fatal to great masses of population, not only within the country bombarded, but perhaps in the country which launched them.

4. The problem is further complicated because, so far as we know now, any large-scale commercial use of atomic energy as a power source is more or less inextricably linked to a potential military use. It is true that, if atomic power becomes economically feasible (which is by no means certain for a long time to come), it would require only low-grade concentrates of fissionable material, which would need further elaborate and costly processing before reaching explosive potential. But the process of producing such low-grade concentrates constitutes perhaps two-thirds of the industrial effort required to make effective bombs. It follows, then, that if nations were to equip themselves to produce large quantities of low-grade concentrates for power generation, the effort required to develop large-scale bomb production would be materially reduced. Moreover, the maintenance of an effective inspection to police agreements not to produce bombs might be forbiddingly difficult if atomic power generation were allowed.

5. In addition to the major problem posed by the use of atomic bombs in international war, any nation which produces or possesses such bombs, or the fissionable materials with which they are loaded, faces still another in the danger of their falling under the control of paranoid elements in its own population.

What Are We Going To Do About It?

We face the hard fact that we have produced a weapon capable of destroying whole nations—perhaps even the whole world. Although we were importantly aided in its development by the nationals of other countries, we, together with Great Britain and Canada, now must take the initiative in deciding what shall be done with it. We have only two choices. We can try to keep this weapon as a monopoly of our own, or we can try to place it under broad international control.

Can We Keep It To Ourselves?

If we know one certain fact about the atomic bomb, it is that it cannot long be held as a monopoly of those nations which produced it.

If Nazi Germany had succeeded in developing the weapon first, it probably would have attempted to achieve world dominion, with utter destruction as an alternative. Such a course is not within our range of choice. It violates every principle for which we stand.

Much reckless nonsense has been uttered concerning the inability of other nations to master the scientific, engineering, and industrial problems involved. It is the virtually unanimous opinion of those who worked on the project that several nations today are fully equipped in science, engineering, and industrial organization to produce atomic bombs and to provide the means for launching them. At least one of these nations, Russia, has also access to an ample supply of the necessary raw materials. The only debate is over whether it would take three, or five, or ten years for her to marshal her resources to produce bombs in multiple thousands. Once such an atomic race were on, we have no reason to believe that Russia might not divert more resources to the task than we ourselves should be willing to put into it.

Additional nonsense is talked as to how we might attempt to cope with the problem of living in a world in which mutually suspicious or hostile nations faced each other, with stores of atomic weapons on both sides. We hear talk of dispersing our cities and even of moving underground. No one has seriously reckoned the difficulty or the cost of following such counsel of despair. Still less has anyone appraised the neurotic effect upon men's minds of living by any such preposterous formula, under continuously mounting tension day after day, and year after year.

Certainly, if we could find no way to prevent the competitive production of atomic weapons, we should be driven at least to the selective dispersion of our bomb-launching facilities, of certain key industrial establishments, and of our centers of government and governing personnel. We should be forced, also, to change our traditional requirement that only Congress can commit us to active war. We should be forced to organize ourselves as a police or military state, with our scientists regimented and muzzled, with all of us under constant surveillance against the smuggling and planting of time-bombs, and constantly alerted against attack through the air.

Before we commit ourselves to any such intolerable procedure, we should be mad not to explore all possible means for making it unnecessary.

The Only Feasible Alternative Is Effective International Control

This cardinal principle has been recognized in the statement of November 15th, issued jointly by President Truman, and Prime Ministers Attlee and King. Their statement frankly concedes that against atomic weapons there can be no adequate military defense, that no nation can command a monopoly of such weapons, that responsibility for eliminating atomic energy as an instrument of war and for devising safeguards over its use for the advancement of science and other peaceful and humanitarian ends rests upon the civilized nations of the world.

They propose that a commission be set up at once under the United Nations Organization to make recommendations: (a) for extending between all nations the exchange of basic scientific information for peaceful ends, (b) for control of atomic energy to the extent necessary to ensure its use only for peaceful purposes, (c) for the elimination from national armaments of atomic weapons and of all other major weapons adaptable to mass destruction, and (d) for effective safeguards by way of inspection and other means to protect complying states against the hazards of violations and evasions.

Already criticism is leveled at the wording of the statement, at alleged omissions, at the wisdom of choosing the United Nations Organization as the medium through which to seek agreement in view of the weaknesses of the UNO Charter.

None of these issues should be crucially important. What matters is that an invitation has been issued in good faith for the nations of the world to meet and decide upon means for assuring the elimination of weapons, the existence of which no one can afford to tolerate.

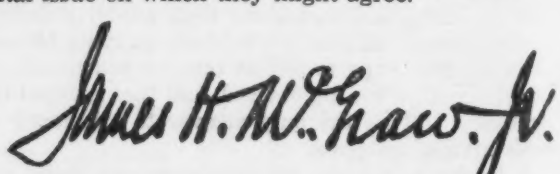
The decision cannot be other than international; it will require the best thought of the best brains the world can muster. The smaller nations have an equal stake with the large, and from them may well come the most fruitful suggestions. But Russia now holds the key to the success or failure of our proposal. If she accepts our invitation, no other nation will refuse.

Alternatively, there will be an international armament race paced by atomic weapons. It will mean an end of free science, a severe policing and regimentation of international travel and trade, and innumerable restrictions upon those individual freedoms which we have just fought so desperately to preserve. This is the dismal prospect if we fail to arrive at a genuinely international accord on the control of atomic energy. But even this interval would promise to last only for an uneasy period, until someone started pressing the push-buttons on the panel-boards of extinction.

The only permanent solution lies in finding means to eliminate war itself. That we cannot hope to achieve overnight, but we can, and do hope that the nations will now agree to eliminate atomic weapons and their radioactive by-products as instruments of war.

If they do that, we can move forward more surely to the constructive development of the incalculably valuable resources that science has newly opened to our use. And, we can hope also for a progressive improvement in international understanding.

Unless the nations can reach agreement on this paramount issue of atomic energy, it is difficult to conceive of any vital issue on which they might agree.



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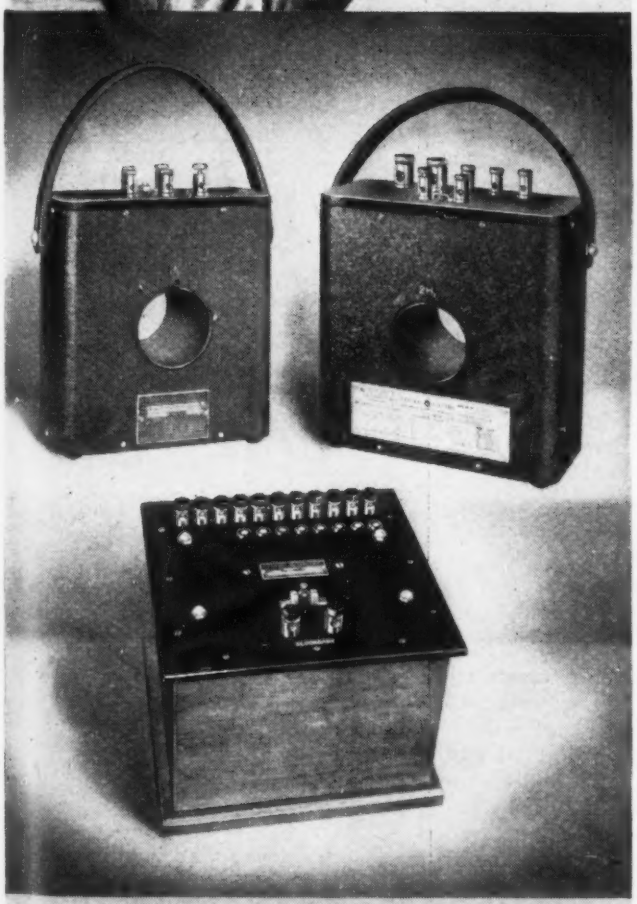

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These three types are the latest additions to our line of portable instrument transformers. The complete line includes current transformers for ratings of 0.25 to 2500 amperes, and potential transformers for 240 to 4800 volts.

For further information on portable instrument transformers to meet your field or laboratory requirements, write to the nearest G-E office or to Apparatus Dept., General Electric Company, Schenectady 5, N. Y.

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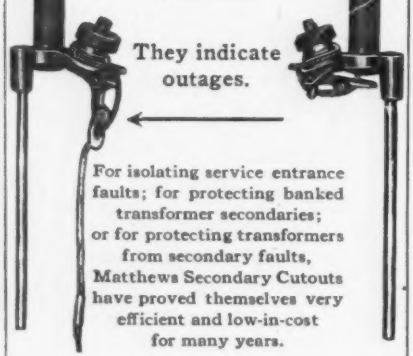

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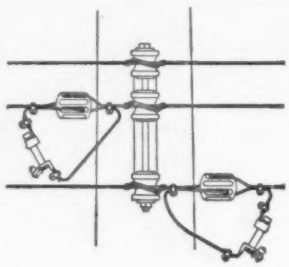

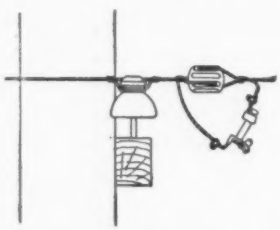

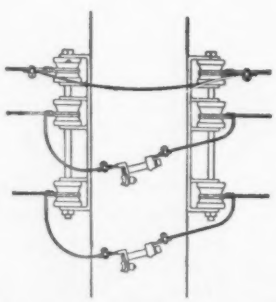

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MUNICIPAL GROUP DISCUSSES BETTERMENTS, LOAD BUILDING

More than ten million dollars will be spent on electric system betterments by Los Angeles Department of Water and Power during the present fiscal year ending June 30, 1946, stated Samuel B. Morris, general manager, speaking before the annual conference of the California Municipal Utilities Assn. held in Fresno, Nov. 15 and 16. Major projects to be started, expenditures on which during the remainder of this fiscal year are included in $10.700,000 to be spent, are: second 65,000-kw. unit at Harbor steam plant, $6,300,000; transmission line between stations B and D, $2,300.000; distribution substations, $1,500,000, and receiving substations, $2.100,000. The city, along with other utilities of southern California, will re-engage in load building promotion through the recently reorganized Southern California Radio & Electric Dealers Assn. A wiring allowance of $35 will be made by the city for the first unit in a range and water heater combination, and $10 for the second unit. This is expected greatly to stimulate range sales.

Ensuing discussion on load building brought out the fact that city sewer systems will not handle the burden added by garbage disposal units and the necessity for early study of the problem. Following a paper on surplus materials, the association went on record as favoring nominal prices for surplus materials rather than OPA ceiling prices.

History of utility regulation, by L. Harold Anderson, president, California Railroad Commission, was one of a number of other interesting papers presented. Glenn A. Baxter of Alameda was re-elected president and J. H. McCambridge, Burbank, was elected first vice-president.

Edison Lets Contracts for Conversion to 60 Cycles

Contracts for the conversion from 50 to 60 cycles of power accounts approximately five horsepower and over have been awarded by the Southern California Edison Co. to Stone and Webster Engineering Corp. and Bechtel Brothers McCone Co. The contracts cover surveying, engineering and construction of conversion facilities of customer-owned equipment.

Edison will change over customer-owned equipment of domestic, agricultural and small commercial customers. The company will do the surveying and engineering, while the actual field conversion work will be contracted.

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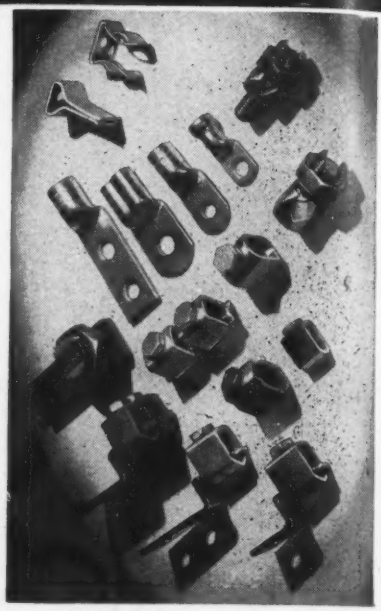
Electrical Connectors



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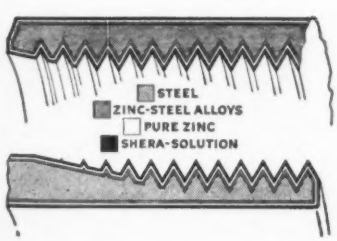

Cross-section of Sherarduct

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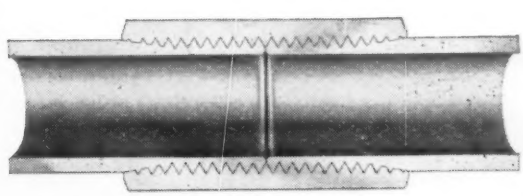
Even deposit of the zinc gives a uniformly protected, smooth surface over which is applied Shera-solution which impregnates the zinc. In addition, the steel is "Spellerized" to produce a pipe which works more smoothly, bends easier and threads cleaner.



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TEXAS COMPANY FILES FOR SERVICE IN NEW MEXICO

Community Public Service Co. of Fort Worth, Texas, which recently bought the Ruidoso Light & Power Co., has filed notice with the New Mexico Public Service Commission of desire to supply electricity to 350 customers in several small communities in Lincoln County, southeastern New Mexico.

The company estimates cost of necessary lines at $81,650. It recently was granted authority to construct a high line from Alamogordo to Ruidoso.

Extensions of power lines 60 miles to Mogollon by way of Gila Valley and 40 miles to the Upper Mimbres Valley from Silver City, N. Mex., also are planned. These extensions would provide electric service for most of Grant County.

Maintenance Work Starts at Two Edison Power Houses

A contract for maintenance work on water conduits for the Borel and Kern River power houses of Southern California Edison Co., has been awarded to Morrison and Knudsen. Work started in mid-October and is expected to be completed before Dec. 15. Estimates of the costs are between $500,000 and $600,000.

Work on the Borel plant intake includes concrete and granite repair of approximately 15,000 ft. of canal and repainting of about 5,000 ft. of steel flumes. The Kern River No. 3 conduit work consists of cleaning, guniting and painting sections of the tunnels and covered conduit, and flame cleaning and painting the interior of the Brush Creek syphon and the plant penstocks.

Several hundred men will be employed when the work reaches its peak.

● SEATTLE CITY LIGHT has been asked to prepare for a "vibration study" at Ross Dam on the Skagit River, according to City Light Superintendent E. R. Hoffman, who recently returned from a conference in Denver with officials of the Federal Power Commission. The work will be part of the government's national research project covering dams and power installations all over the nation. The study at Skagit will be undertaken within the next two years, when the accelerograph recording device will be installed in two huts on top of Ross Dam.

● WORKMEN at the Trentwood, Wash., Defense Plant Corp. aluminum rolling mill recently objected to use of copper wire in a Bonneville Power Administration transmission line that crosses plant property, because "it looks out of place" at the large aluminum plant—now being placed in standby condition by Aluminum Co. of America. Bonneville officials explained that aluminum wire is not currently available for construction of the line that will deliver electricity to the Inland Empire Rural Electrification Inc., a cooperative.

● SEATTLE CITY LIGHT has discontinued bi-monthly billing of residential accounts, a wartime measure, and will deliver monthly bills to its 88,000 customers. According to Superintendent E. R. Hoffman, return to the peacetime procedure will give full service to customers and permit rehiring of employees returning from the armed services.

● DISMISSAL CASE of Zerah H. LaPrade, former civil service junior electrical engineer in the Los Angeles Department of Water and Power, has been returned to the board of commissioners for a rehearing by the California State Supreme Court. LaPrade had been discharged in August 1942, because of a statement of his in the civil service employees' magazine during a bitter wage fight that the board "is rolling in profits of war industries." He had been in civil service 21 years.

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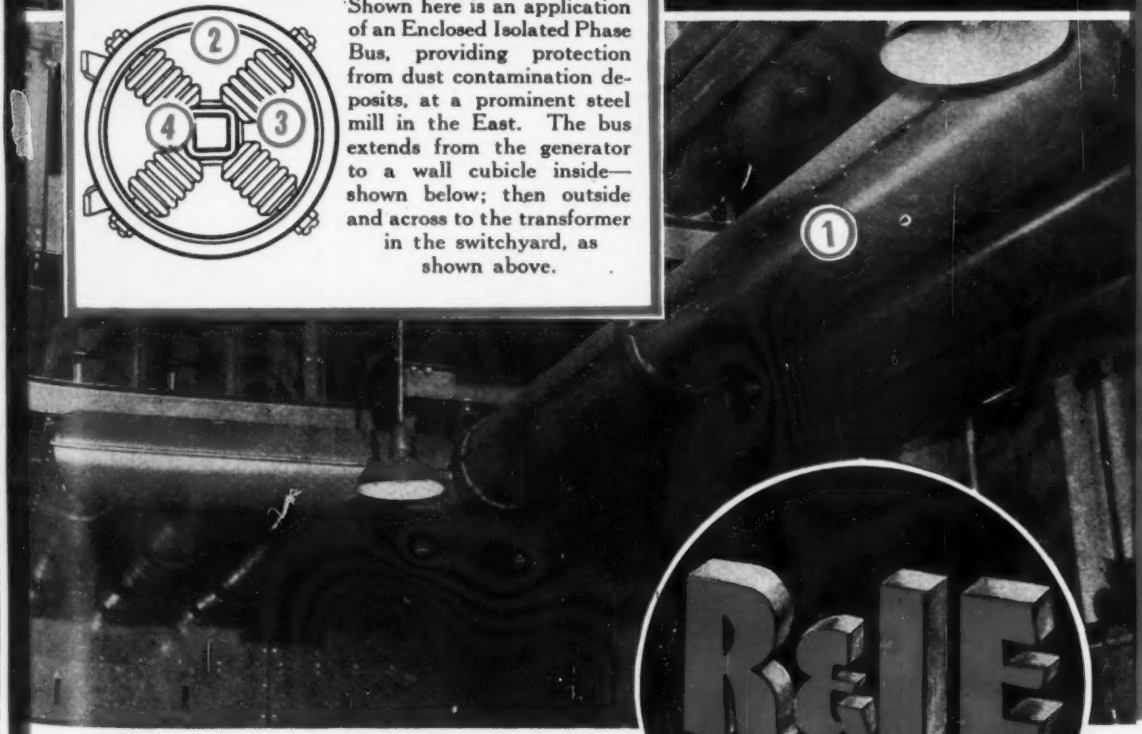

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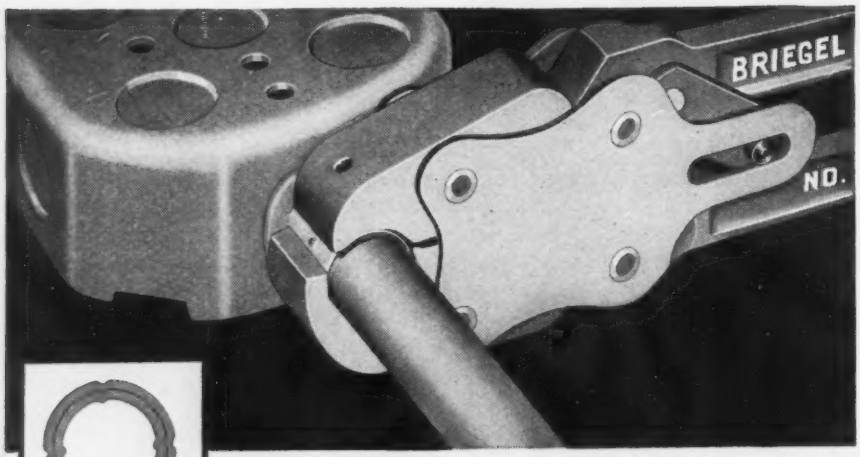

Cross section Showing Indentations.

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WATER STORAGE REPORTED GENERALLY ABOVE 1944

Water storage for power generation was generally higher at the end of the water year, Sept. 30, than at the end of the previous year, according to the Geological Survey review recently released.

In the Northwest, the Columbia River storage at Grand Coulee was reported down from 9,671,000 acre-ft. to 9,639,000 acre-ft., although storage in four major reservoirs in the same state remained about the same and about normal. The major reservoirs in Montana reported storage slightly in excess of a year ago, but the smaller reservoirs were down a little.

Storage in five major power reservoirs in California was reported more than 110% of last year.

PUD Bond Issue to Pay for Clark County Properties

A $1,000,000 bond issue to provide funds for taking over the properties of Portland General Electric Co. in Clark County, Wash., has been contracted by the Clark County PUD with the Ballard-Hassett Co. of Des Moines, Iowa. Bonds will be of $1,000 denomination, paying 2½% interest and maturing in from three to 25 years. Manager George Hibbert said there was no call for bids on the issue.

A jury in the United States District Court at Tacoma recently fixed the value of the property at $801,000. The bond issue will complete this payment and take care of other expenses, including new equipment, Hibbert said.

● IN FACE of repeated denials of its franchise bid by the city council and at the polls, Salem Electric Cooperative made a new attempt to extend its service recently, when it applied for permission to purchase abandoned poles of Oregon Electric Railroad Co. Application was tabled by the Salem council for two weeks, and in the meantime, Portland General Electric, which serves the area, purchased two 16-mile sections of the old railroad line, with the announced purpose of providing an alternate power line to Salem.

● A 138-MILE TRANSMISSION line carrying Fort Peck power to Glendive, Mont., was energized late last month. Completed at a cost of $550,000, the line will serve irrigation pumping plants in the Yellowstone Valley and, according to H. D. Comstock, USBR regional director, will permit future services to a number of REA co-ops in Montana and North Dakota.

NEW MEXICO COMMISSION APPROVES UTILITY SALE

Sale of certain New Mexico Public Service Co. properties in San Juan County has been approved by the New Mexico Public Service Commission.

The town of Farmington will take over properties located in the town and extending five miles from its corporate limits at a purchase price of $210,000. The town was authorized to issue light and power revenue bonds in the amount of $225,000. Basin Power & Light Co. will acquire the remainder of the San Juan division system for $90,000. It was authorized to issue $100,000 of first mortgage bonds.

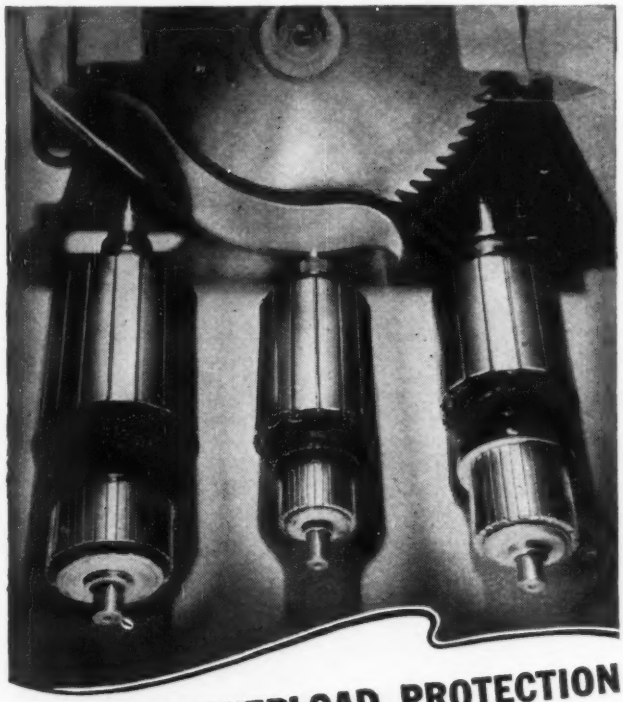
● A Low Bid of $766,926 was entered by Westinghouse for four 50,000-kva. transformers to be installed in a new Bonneville substation scheduled for construction at Snohomish, Wash., early in 1947. Specifications call for installation of forced-air cooling to give a rating of 66,667 kva. and additional forced-air cooling, or combination of forced-air and forced-oil cooling, to give a rating of 83,333 kva. Three of the units will be installed in a single bank at the station; the fourth will be a spare.

● New Mexico Public Service Commission has approved transfer and sale of the Dawson division utility properties of the New Mexico Power Co. to the Trinidad, Colo., Electric Transmission, Railway and Gas Co. Sale price was $526,101.

Four New Mexico towns, Springer, Cimarron, Maxwell and Wagon Mound, had protested the sale, but the commission, in its order, overruled their protests.

● Seattle City Council has received a request from City Light Superintendent E. R. Hoffman for permission to spend $1,100,000 to increase the capacity of the primary network distribution system in certain parts of the city, the expenditures to be made from available City Light funds. Hoffman stated that various new unit substations, additional feeder-line facilities and property will be needed.

● Two 75,000-kw. generators diverted from Shasta Dam for temporary use at Grand Coulee are being removed for return to California. They will be replaced at Coulee by three new 108,000-kw. machines. The first Shasta machine installed at Coulee went into service Feb. 25, 1943, and was to go off the line Dec. 3; the sister unit began operating at Coulee on May 7, 1943.



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POWER COMPANY ADOPTS POST CARD BILLING

The United States postal authorities have approved post card billing to Washington Water Power Co. customers, and this new system will go into effect during November, according to J. E. Winton, assistant treasurer.

This type of billing, which is extensively used by utilities throughout the nation, will be a great advantage over the old method. It will not only render quicker billing service to the customer, but it will eliminate the tedious insertion of bills into envelopes. Attached to the post card is a business reply card which the customer may use for any correspondence in connection with his account.

Employee meetings, during which this new method will be thoroughly explained, are contemplated in the near future so that employees will be in a position to answer any question customers may ask in connection with this new manner of billing.

● PUGET SOUND Power & Light is winner of a bronze "Oscar" given by *Financial World*, national weekly investment magazine, in a judging of annual stockholder reports. Awarded to the Puget Power report as "best of its industry," the "Oscar" was designed by Rene Paul Chambellan and was presented at a dinner in New York. More than 2,500 reports were entered in the all-industries contest, which was open to American, Canadian and Latin American companies. Puget Sound also was winner in the Reddy Kilowatt Annual Report Contest earlier in the year.

Oregon Utility Commissioner Reports on Rate Reductions

Average charge per kilowatt-hour made by seven large electric utilities operating in Oregon was reduced about 10% in the period between Jan. 1, 1943, and Sept. 30, 1945, according to George H. Flagg, Oregon public utilities commissioner. In this period the rate for residential and rural consumption was reduced from 2.09 cents to 1.88 cents. This compares with a national average at the end of 1944 of 3.51 cents.

The average revenue per kilowatt-hour from all users in Oregon, including commercial and industrial operations, was 1.48 cents as of Jan. 1, 1943, and 1.35 cents on Sept. 30, 1945. The national average was 1.65 cents.

Five 25-year men with Pacific Electric Motor Co., Oakland, each received a silver tray and congratulations from officials of the company. The five, standing between Walter D. Vance, Jr., secretary of the company, on the left and Frank Boyd, president, on the right, are: Frank A. McGrade, William J. Larsen, Seldon Tosteson, Charles Elvin, and John Petersen. The old timers were honored at a cocktail and dinner party given by the company for more than a hundred of its employees at Sequoia Country Club, Nov. 2. Of Pacific Electric Motor Company's organization of 150 people, twelve have served from five to ten years, ten from ten to twenty years and twelve from twelve to twenty-nine years. One other man had rounded the quarter-century mark before the five mentioned. He was Sheldon Feldman, honored four years ago on the night of the war's longest blackout. The company was founded in 1909 and incorporated in 1921. President Frank Boyd joined the late Walter Vance, Sr., in 1928

TRADE notes

Westinghouse Opens New Tacoma Branch Office

Westinghouse on Nov. 19 opened new branch headquarters at Tacoma, Wash. Located at 1930 Pacific Ave., the new quarters take three floors of a four-story building and provide 18,000 sq. ft. of space, more than twice that at the former location.

The move, according to J. R. Wells, Tacoma manager, demonstrates the company's confidence in the business and industrial future of the area.

The building, which is 50 ft. wide by 120 ft. deep, has been completely remodeled. A new and modern lighting system has been installed and provisions have been made for efficient handling of stocks, orders, deliveries and service. Offices and display space is provided on the first floor.

● ELECTRICAL PRODUCTS Consolidated, Spokane, of which H. L. Jensen is manager, will erect a new business building. It will be one story, of brick and cement block construction, and is estimated to cost between $45,000 and $50,000. The new structure will be devoted to the concern's neon sign manufacturing business and will be at E 411 Sprague Ave., with a street frontage of 75 ft. and a depth of 150 ft.

● STANDARD ELECTRIC Co. opened recently in Ogden at 2243-45 Washington Blvd. The firm will handle electric appliances, sound equipment and phonograph records and will include a service department. Owners are Darrell J. Iverson and Stephen J. Donovie.

● PRESSED STEEL CAR Co., domestic appliance division, has announced the following distributor appointments: Kinney Brothers, Los Angeles; Edward F. Hale Co., San Francisco; Pacific Coast Heating & Appliance Co., Seattle.

● RCA VICTOR has named Edmund S. Winlund industrial electronics engineer for the Pacific region, with headquarters at 621 Hope St., Los Angeles.

● THE ARMY-NAVY E was presented to Fanger Research & Mfg. Co., San Francisco, division of the H. R. Basford Co.

● FLUORESCENT FIXTURES of California, manufacturers and designers, have moved to 810 Ellis St., San Francisco.

ASBESTOS VARNISHED CAMBRIC WIRE AND CABLE • ARMORED CABLE •
COLLYER "RESISTOL" SYNTHETIC RESIN INSULATED WIRE • LEAD COVERED
NON-METALLIC SHEATHED "CABLEX" • "RESISTOL" JACKETED CABLE
& COLLYER SERVICE ENTRANCE CABLE •
RU BLE
CA RE
& T RD
CABL OL
CABLE IO
WIRES • PARKWAY & AIRPORT CABLES •
RUBBER • SLOW • BARE & TINNED WIRE • PARKWAY
BURNER CABLES • LACQUERED WIRES • FLEXIBLE CORDS •
• NEON SIGN & OIL BURNER IGNITION CABLES • TELEPHONE WIRE
LOCOMOTIVE GATHERING CABLE • ARMORED CABLE • POWER CABLES
RUBBER SHEATHED PORTABLE CABLE IRE
• SUPERFLEXIBLE WELDING CABLES •
RUBBER INSULATED WIRE • HEAVY BLE
NON-METALLIC SHEATHED "CABLEX" RE
IGNITION & AUTOMOTIVE WIRES • RD
• WEATHERPROOF WIRE & CABLE OL
CABLE • COLLYER SHIPBOARD CABLES IO
WIRES • SLOW BURNING WIRES •
RUBBER & LEAD CABLES • CABLES OIL
• RADIO WIRES • INSULATED WIRE •
ASBESTOS VARNISHED CAMBRIC WIRE AND CABLE • COLLYER RESISTOL"
HEAVY DUTY RUBBER SHEATHED PORTABLE CABLE • CONTROL CABLES •
• COLLYER ASBESTOS WIRE FOR HIGH HEAT RESISTANCE • POWER CABL

Collyer WIRE & CABLE

TO CARRY ELECTRICITY FROM ANYWHERE TO ANYTHING

CARRYING ELECTRICITY for the lights of a city or those of a lonely farmhouse . . . bringing power to the humming machines in countless factories or to mining locomotives deep in the earth, Collyer Wires and Cables contribute to the throbbing life of the world; for portable tools, home appliances, chattering telegraphs and jingling phones,—wherever electric power must be conducted or communications maintained . . . on the ground, in the air or on the seas . . . Collyer builds quality wires and cables to meet every specific need.

Let us know your requirements

Collyer
INSULATED WIRE CO.
PAWTUCKET, R. I.

ALLIED INDUSTRIES INC.: LOS ANGELES . . . SAN FRANCISCO . . . SEATTLE

DEPEND ON—INSIST ON—

P. R. MALLORY & CO., Inc.

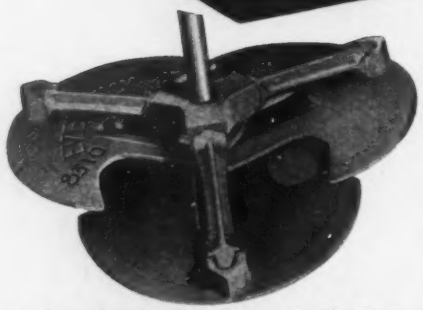
MALLORY

Capacitors

Mallory Type "P" Capacitor:—Plastic case overcomes moisture absorption problems, and provides maximum insulation. May be used to replace cardboard insulated aluminum-case capacitors. Splash-proof plastic end cap and simplified "snap on" mounting bracket available when capacitor is used as original equipment.

Distributed by
INSULATION AND WIRES INCORPORATED
SAINT LOUIS 3, MISSOURI
BOSTON 20, MASS. DETROIT 2, MICH. ATLANTA 3, GA.
HOUSTON 2, TEX. BLUEFIELD, W. VA. NEW YORK 7, N. Y.
SITTLER COMPANY
CHICAGO 7, ILL.
H. A. HOLDEN, INC.
MINNEAPOLIS 3, MINN.
W. C. JOHNSON COMPANY
PEORIA 5, ILL.
TRI-STATE SUPPLY CORPORATION
LOS ANGELES 13, CAL. • SAN FRANCISCO 7, CAL. • SEATTLE 4, WASH.

First CHOICE IN ANCHORS



EVERSTICK

For dependable anchoring under all conditions, use Eversticks. Made of tough, rust-resistant, malleable iron . . . quick and easy to install . . . expand in undisturbed earth. Preferred by engineers and crews alike.

Write for latest Everstick bulletin.

EVERSTICK ANCHOR CO.
FAIRFIELD, IOWA

H. H. Van Luven

307 East 3rd St. Los Angeles (13)
MUtual 5173

Manufacturers' Representative

CANNON ELECTRIC—DEVELOPMENT CO.
Hospital Signal Systems
Motor Plugs—Receptacles
Cable-Wire Terminals

LENZ ELECTRIC MFG. CO.
Lead—Braid Covered Cables and Wires
Tinsel and Copper Cordage
Special Cables

SIGNAL ENGINEERING & MFG. CO.
Relays—Bells—Horns—Code Call Systems
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HART MANUFACTURING COMPANY
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STERLING SIREN CO.
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OPERADIO MANUFACTURING CO.
Flexifone Intercommunication Equipment

TRICO FUSE MFG. CO.
Fuses, Oilers, Clip Locks and Fuse Pullers

KNOX PORCELAIN CORP.
Electrical Porcelain.

● A NEWLY CREATED company, known as Bethlehem Pacific Coast Steel Corp., took over the former Pacific Coast steel division of Bethlehem, effective Nov. 1. The new company will operate steel plants at Seattle, South San Francisco, Los Angeles; mill depots at Seattle, Portland, San Francisco, Los Angeles; fabricating shops at Alameda, South San Francisco and Los Angeles. H. H. Fuller, former vice-president of the Pacific Coast division, is president of the new company. General offices are at San Francisco.

● G. E. MERCHANDISING plans in the Los Angeles area were discussed at a recent dealer meeting conducted by S. B. Maher, general manager of the company's appliance branch. Fewer but better dealers will be the policy, and advertising plans include unusually heavy magazine schedules, supplemented by radio, newspaper, direct mail and point of sale display material, the dealers were told. Presentation was made of the new store planning book, *Your General Electric Appliance Store*.

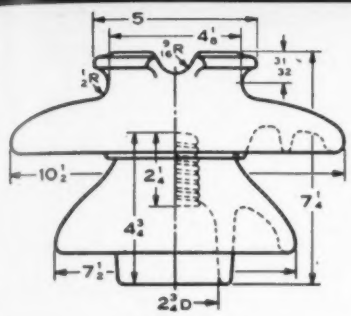
● COPPERWELD STEEL CO. on Nov. 1 opened Pacific district offices in the Rialto Bldg., San Francisco. Harry J. Billica, Pacific district manager, will supervise the new offices. Clayton E. Ingalls, former sales agent for Copperweld in the area, has been retained in an advisory capacity, but will devote his time largely to his own manufacturer's agency.

● HURD FARM ELECTRIC SUPPLY is a new firm in Spokane, having recently purchased the Spokane Dairy Supply at W. 203 Trent Ave. The new firm, selling farm and dairy equipment, is backed by agricultural engineering and rural electric experience. C. J. Hurd is manager and associated with him in business are: L. C. Nihoul, Mrs. L. F. Clukey, E. R. Russell and Hugh Rear.

● AT WAITSBURG, Wash., the Hamilton electric appliance store, of which Walt Hamilton is owner and manager, is undergoing a remodeling program which will place it among the largest concerns of its kind in the Northwest. It is understood that improvements will result in doubling the floor area and warehouse space. A large garage has also been added.

● EARL REID has opened an electric store in Tonasket, Wash., under the name of Earl's Electric Appliance Co. He will carry a general line of electrical equipment, including Hotpoint ranges and refrigerators and Stewart-Warner radios and will have a furniture department. Reid formerly owned the Trading Post in Tonasket.

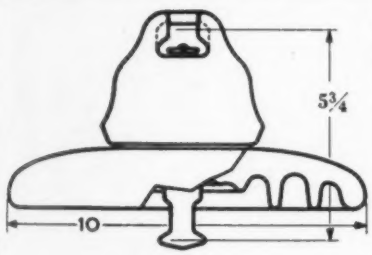
THOMAS
PORCELAIN INSULATORS



NO. 2124-M
45 Kv. Rating

Dry Flashover	125 Kv.
Wet Flashover	85 Kv.
Rec. Pin Height	8 In.
Std. Pkg. Crate	6

This insulator generally used on 33 Kv. can also be furnished in one-piece design (No. 1924). Mechanical, thermal and electrical characteristics are well balanced insuring long life in service.



NO. 21243
15,000 Lb. Min. Combined M. & E. Rating

Dry Flashover	80 Kv.
Wet Flashover	50 Kv.
Leakage Distance	11½ In.
Std. Pkg. Crate	6

This design is offered in a wide range of spacings in both Ball-Socket and Clevis types which fulfill all strain insulator requirements.

● Service records prove these units will serve faithfully under all conditions. Call our nearest sales representative for speedy delivery.

WESTERN REPRESENTATIVES

Los Angeles	R. E. Cunningham & Son
San Francisco	Geo. E. Honn Co.
Seattle	Ken H. Best
Phoenix	J. E. Redmond Co.
Denver	R. F. Hamilton & Assoc.

THE R. THOMAS & SONS CO.
LISBON, OHIO

PEOPLE
made this news:

● M. F. BEISBER, since 1941 Line Material Co. transformer engineer on the West Coast and in the Mountain States, has been appointed sales manager of the company's transformer division. He will have headquarters at Zanesville, Ohio, where transformer production is centralized. In the West he was headquartered in San Francisco.

● TRUMAN C. THOMPSON, former Pacific Coast division manager for Stromberg-Carlson, has been promoted to telephone sales manager, with headquarters at Rochester, N. Y. ● NELS A. SWANSON has joined Foxboro Co. as sales engineer at Los Angeles.

● W. H. PARK was made East Bay division manager and L. J. BRUNDIGE Sacramento division manager, in promotions announced last month by Pacific Gas and Electric Co., effective Jan. 1. Park, now manager of the Berkeley office, succeeds LEE H. NEWBERT, who retires after 45 years with the company, 25 in his present position. Brundige succeeds E. W. FLORENCE, also a 45-year veteran and Sacramento manager since 1920, who retires Jan. 1. WILLIAM R. BOWLER will take Brundige's post as manager of the De Sabla division at Chico, being transferred from Sacramento division sales manager. Park will be succeeded at Berkeley by WALTER D. HOWELL, who is returning after three years in the Navy, during which he attained the rank of lieutenant commander.

● KATHRYN GATES FRAZER, editor of the *New-Meter*, employee magazine of San Diego Gas & Electric Co., has resigned to take up homemaking with her returned husband, CAPT. WILLIAM FRAZER, USMC, who will rejoin that power company's transportation department soon. ● ASHTON B. COLLINS, daddy of Reddy Kilowatt, called on various Western utilities on his way to and from Hollywood where he went to preview Reddy's entrance into the movies. ● FRED F. LUKE, general manager, Allen-Bradley Co., Milwaukee, visited the Coast for the first time since the war, meeting with his company's agents, Garland-Affolter Co., H. D. Easterbrook, Los Angeles and others.

● NAMED honorary members of the Washington Electric Club were C. D. HEPLER, president of the Trumbull Electric Mfg. Co., Pacific Coast division, recently transferred from Seattle to San Francisco to open a branch office, and A. NICHOLSON, Seattle City Building Department.

Make all taps "hot" with TIPS clamps and clamp sticks

Tap on to steel, copper or aluminum conductors while lines are still energized. Tips Tap Clamps make a tight, positive contact that will not jar loose, but does not stick and can be removed "hot" with a Clamp Stick. Write for details of types and sizes.

Complete equipment for making hot tap connections should include the Grip-All clamp stick—available with either set of jaws as shown above. The hand grip will open and close the jaws to contact the clamp, close on the eye screw and pull the clamp into the head to make a rigid unit for applying the clamp to the conductor. Write for detailed information.

A·B·CHANCE CO. CENTRALIA MISSOURI

You Bet, TRICO
RENEWABLE FUSES
ARE
POWDER-PACKED

As shown, the renewal element (the heart of any fuse) is **different!** It's custom-built! The fusible link is enclosed for full protection. No twisting, bending, kinking or fractures to reduce carrying capacity before the link is actually inserted in the fuse casing.

The powder-packing supports the link and prevents sagging, stretching or thinning out which always causes premature blowings and unnecessary shutdowns.

Only **genuine** TRICO elements of the **correct size** can be inserted in TRICO FUSES. This non-interchangeable feature guarantees top-notch efficiency—no tampering—no "doubling-up" of links to damage instead of protecting expensive equipment.

For maximum protection and three times the service INSTALL TRICO RENEWABLE FUSES.

Write for Bulletin No. 1

- TAMPER-PROOF
- NON-INTERCHANGEABLE LINKS
- SAFE TIME LAG
- LINK SUPPORT
- LIFE-TIME OUTER PARTS
- GUARANTEED RESULTS
- COST NO MORE

COAST REPRESENTATIVES
W. E. Young Co., 1944 Broadway, Denver
H. H. Van Luven, 307 E. 3rd St., Los Angeles
Albert S. Knight, 3006 Western Ave., Seattle
Hughson & Merton, 1270 Bush St., San Francisco

TRICO

TRICO FUSE MFG. CO. Milwaukee, Wis.

HELWIG SPEER
Carbon Products

BRUSH KITS OF ALL DESCRIPTIONS
CARBON BRUSHES OF ALL DESCRIPTIONS

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166 Jackson Street
Seattle, Washington Elliott 7133
711 N. W. Everett St.
Portland, Oregon Beacon 3368
225 W. Pico Blvd.
Los Angeles, Calif. Prospect 2523

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Crompton Tong Test Ammeters
Cornell-Dubilier Electric Corp.
Capacitors for Power Factor Correction
T. J. Cope, Inc.
Underground Tools & Equipment
Herman D. Steel
Meter Jewels
Kellems Co.
Cable Grips for Pulling and Permanent Support
Minerallac Electric Co.
Insulating Compound, Clips, Hangers, and Statiscopes
Schweitzer & Conrad
Fuses and Protective Devices
Specialty Device
Cone Anchors, Guy Guards and Earth Augers
The States Company
Test Blocks and Meter Testing Equipment
R. Thomas & Sons Co.
Pin-type and Suspension Insulators
Electroline
Wire Rope Fittings

● BONNEVILLE has appointed ROBERT B. ELLIOTT as chief of its utilization section. Before his appointment, Elliott served with WPB as head of the Office of Civilian Requirements for Oregon and southern Washington, and was in charge of the government division of WPB. He has had 18 years experience in the sales field, including five years as sales promotion and advertising manager for Portland Gas & Coke Co. ● HERSCHEL F. JONES, former assistant to the OWU director, is now assistant to Barclay J. Sickler, chief of Bonneville's sales and service division. He will prepare power load estimates. ● ALVIN L. DUNMIRE is administrative assistant in the Bonneville southwestern district, with headquarters at Eugene, Ore. He was transferred from Portland.

Lind

● BLAINE R. LIND is now Graybar merchandising manager for San Francisco, Oakland and Sacramento. He comes to his new headquarters in San Francisco from the state of Washington, where he has had broad experience in sales work. Before joining Graybar nine years ago, he was with Frigidaire in Seattle. ● CLARENCE ARNOTT has been made assistant general superintendent of B. C. Electric on Vancouver Island.

● DOUG DONOHUE, chief engineer for Trumbull Electric and with that firm for 17 years, has been transferred to the sales department. His territory includes eastern Washington and Montana. ● ROBERT PRUSSIA, during the war years connected with the office of U. S. Engineers in San Francisco, has joined the Corning Glass Co. and will be its representative for industrial glass on the Pacific Coast.

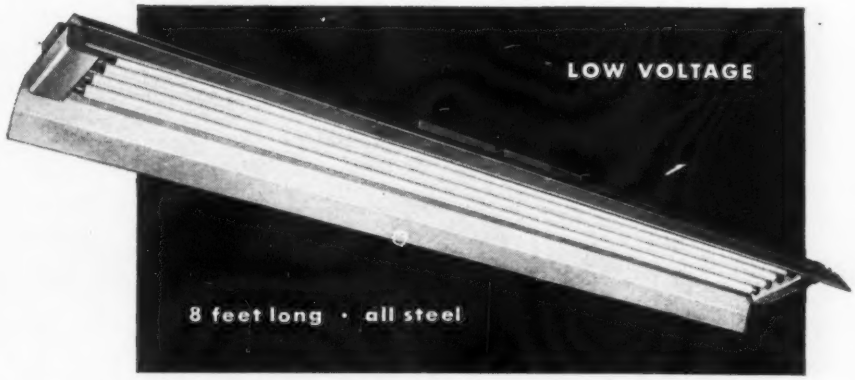
Hansen

● VERE C. HALLIDAY, with Utah Power & Light for 20 years, has been promoted to sales training director on the general sales staff. He will assist also in advertising and sales promotion. ● EVELYN HANSEN will become Utah Power's home service director, succeeding NANCY FINCH. She spent nearly three years in the Navy and was discharged last September with a rating of aviation machinist's mate first class. She formerly was with the company in home service work at Bingham.

● WESTINGHOUSE SUPPLY has announced appointment of WALTER A. MATZINGER as Los Angeles district apparatus and supplies manager and of WILBERT W. BELL as district appliance manager, Los Angeles. ● KENNETH W. THOMAS of Seattle has joined the Spokane staff of Westinghouse Corp. as sales assistant.

Halliday

*COLOVOLT COLD CATHODE INDUSTRIAL FIXTURES



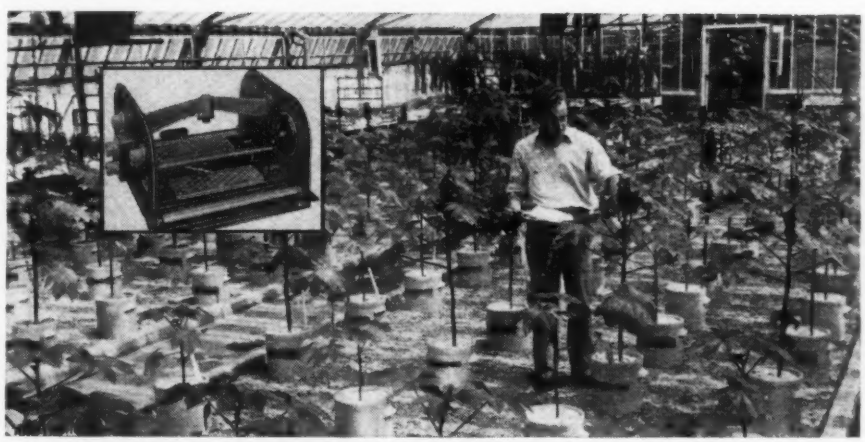
Here is the new Colovolt industrial fixture, one of a complete line of industrial and commercial "packaged" units. Equipped with the standard 93" Colovolt 10,000 hour lamp, Colovolt fixtures may be used singly or in continuous line lighting in multiples of 8 feet. Instantaneous starting, no flickering, guaranteed for 1 year except for failure due to breakage are extra advantages of the Colovolt Cold Cathode low voltage fluorescent lamp. The long life expectancy of Colovolt lamps may be realized even when constantly turned on and off, and *pre-scheduled re-lamping, with no loss of production or time, is now possible with Colovolt installations.*

*Trade mark registered U. S. Pat. Off.

Contact your electrical wholesaler or jobber, or write us for full details and prices.

General LUMINESCENT CORPORATION

GENERAL LUMINESCENT CORPORATION
670 S. FEDERAL STREET CHICAGO 5, ILLINOIS



TURN ON THE HEAT *when and where you want it . . . with NICHROME**

From keeping aerial cameras warm in the stratosphere to protecting delicate roots underground, Nichrome heating elements have been impressed into service to deliver dependable heat . . . wherever and whenever it is required. Because the vital factor of dependability leaves no room for compromise Nichrome has been specified for more new electrical heating applications.

Although there are several excellent Nickel-Chromium combinations there is only one NICHROME and it is made only by Driver-Harris. For improved performance in your new products, specify Nichrome and other resistance alloys by Driver-Harris. Tell us what you need.

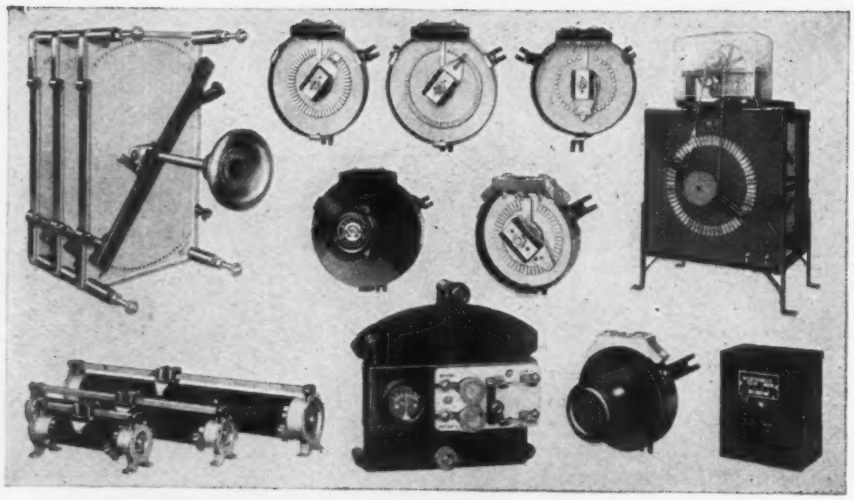
*Trade Mark Reg. U. S. Pat. Off.

Driver-Harris COMPANY

Stocked for the Coast Trade at ANGUS-CAMPBELL, INC.

235-241 San Bruno Ave., San Francisco • 449 So. San Pedro St., Los Angeles • 2122-4th Ave., Seattle

Main Office and Plant: HARRISON, NEW JERSEY



RHEOSTATS

The Ward Leonard line of rheostats includes the widest range of sizes, tapers and current ratings from the tiny types for radio to huge multiple assemblies for the heaviest industrial use. Smooth operation, durable contacts and extreme dependability characterize all Ward Leonard Rheostats, Resistors and Relays. Write for bulletins of interest to you.

ARMY E NAVY

WARD LEONARD

RELAYS • RESISTORS • RHEOSTATS

Electric control (WL) devices since 1892.

WARD LEONARD ELECTRIC COMPANY, 68 South St., Mount Vernon, N .Y.

PEACE ON EARTH...

This year has brought the peace on earth the world long sought.

Now may the new year dawning usher in an era of good will.

May we see more of our fighting men return, and industry directing its full talents to the goods of peace.

As a step in making O. Z. products and services more available to industry in peace, O. Z. inaugurates a new distribution policy. Watch for details next month.

O.Z. ELECTRICAL MFG. CO.

262 BOND STREET · BROOKLYN, 2 N. Y.

Represented by

ASSOC. SALES ENGINEERS . 324 No. San Pedro St., Los Angeles 12, Cal.
THE FRANK H. BRAN CO. . . . 894 Folsom St., San Francisco 7, Cal.
LEONARD S. FOLEY . . 131 South West 4th Ave., Portland 4, Oregon
C. A. KING CO. . . . . 2323 Second Ave., Seattle, Wash.

579

ALL the strength and durability inherent in steel are combined---with definite economies---in Crapo Galvanized Steel Strand. Heavy, ductile, tightly-bonded zinc coatings, applied by the famous Crapo Galvanizing Process, provide lasting protection against corrosion.

Ask the distributor of Crapo Galvanized Products near you or write direct for further information!

INDIANA STEEL & WIRE CO.

MUNCIE, INDIANA

● APPOINTMENT of HAROLD P. HULS to the California Railroad Commission was announced in November. Huls, city attorney of Pasadena, Calif., for 17 years, fills the post left vacant when Richard Sachse was appointed to the Federal Power Commission. ● H. C. SCHWALEN has resigned from the Arizona Power Authority Commission. Head of the agricultural engineering department at the University of Arizona, he was barred from receiving compensation for his services with the authority.

● GEORGE A. LLOYD, recently released from the Army Air Corps, has been appointed sales manager of General Electric's Los Angeles distributing branch. He was with G-E Supply in the San Francisco area before joining the Army. Lloyd and S. B. MAHER, general manager of the branch, left for Bridgeport, Conn., late in November to take part in the company's "refresher course." ● FOLLOWING his release from the Army, ROBERT P. MOSER has been appointed to the newly created position of district advertising and promotion manager for G-E's apparatus department, covering Oregon, Washington and northern Idaho. His headquarters are in Portland. ● PHILIP E. RICE has been appointed manager of the Los Angeles synthetic rubber plant operated by U. S. Rubber Co. ● FRANK A. HANSEN, Western Institute of Light and Vision, Los Angeles, has been elected a Fellow of the IES, highest membership grade in the society. ● HOWARD N. WALTERS has been made acting sales manager of B. C. Electric, following promotion of W. C. Mainwaring. Walters has been with the company since 1926; was manager of the Granville Street store before the war and during the war was on loan to the National War Finance Committee. He returned to the company about a year ago as director of the newly formed industrial development department.

● RALPH B. MATHEWS, B.A., LL.B., has been appointed assistant to the vice-president of the B.C. Electric Railway at Victoria. ● FLT.-LIEUT. F. J. COPE is home after two years on active service overseas. Prior to joining the R.C.A.F. three years ago, Cope was a partner with his father, F. R. Cope, in the electrical wholesale equipment dealers firm of Cope & Son Ltd., Vancouver, B. C. ● BEN ROGERS, who for 14 years was manager of the appliance department of the Firestone Stores Stores in San Diego, has been appointed Westinghouse radio representative in that city.

● F. F. EVENSON, vice-president and general manager of American Products Inc., San Diego, has been elected vice-president of the American Institute of Electrical Engineers, Eighth

District, comprising California, Nevada and Arizona. ● EDGAR W. BARTZ has been appointed welding specialist for Westinghouse in the San Francisco Bay area. ● STUART L. FORSYTH has been made home heating section sales manager for the Westinghouse manufacturing and repair department at Emeryville, Calif. ● VICTOR S. HERRINGTON has been appointed district manager of the newly created transportation division of General Electric's Pacific district apparatus department, with headquarters in San Francisco. ● RICHARD HURF, for several years Pacific Gas and Electric Co. dealer contact representative, has become manager of the appliance department for Bruener's Oakland store. ● RUDOLPH STORMER has been appointed labor relations representative for the Bonneville Power administration, with headquarters at Portland.

Deaths

● EARL BROWN, engineer and business manager at Meyers Safety Switch Co., San Francisco, a pioneer in San Francisco electrical contracting circles, died in mid-November, following a long illness. Mr. Brown had been an electrical contractor, originally being affiliated with Charles A. Langlais, and later was manager and secretary of the San Francisco Electrical Contractors Assn. In 1928 he joined the Meyers Safety Switch Co. An expert estimator he had written many articles for the *Journal of Electricity*, predecessor of ELECTRICAL WEST.

● CYRUS PEIRCE, who had been in the Pacific Coast public utility field for 40 years, died at Los Angeles Oct. 3. Active in the organization of the small utility companies which later were merged into the Pacific Gas and Electric Co., he had most recently been associated with Hill Richards & Co., Los Angeles. At one time he formed his own banking firm which later became Peirce, Fair & Co., and was prominently identified with the organization and financing of the San Joaquin Light & Power Co., Southern California Gas Co., and Caterpillar Tractor Co.

● E. E. CARPENTER, consulting engineer for B. C. Electric, and responsible for all major power developments undertaken by the company since 1923, died Oct. 25 of a pneumonia attack. He retired almost a year before his death.

● HARRY J. HILL, Renton manager for Puget Sound Power & Light Co., died last month of pneumonia.

Did you say NO CRANKING?
I said
NO CRANKING!
VIBROGROUND

GROUND RESISTANCE TESTER

New model for extremes of wet and dry conditions. Four ranges: 0-3, 0-30, 0-300, 0-3000 ohms. Self-contained power source. **No cranking necessary.** Direct readings. No calculations required. Accurate. Speedy. Light portable unit for railway signal departments, telegraph and signal fields, radio broadcasting stations, public utilities, R.E.A. projects—wherever ground testing is essential. Write for descriptive Bulletin.

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AMAZINGLY USEFUL . . .

On Practically All Wiring Jobs

Your electrical jobber now has a new kit of Sherman "Wedge-Grip" Connectors. A total of 55 Connectors in 5 sizes and styles, packed in a durable metal-cornered box, provide the right size connector for all common wire and cable.

"Wedge-Grip" is an ideal pressure connector for a wide range of applications in residential, commercial and industrial work. Whether you want to splice a broken wire, put in a junction box, hook in a new fixture, move an electric motor, or do any one of a score of other jobs . . . just pick out the right size "Wedge-Grip" Connector from the Service Kit, tighten it up on the wires, and the job is done.

The price per Kit is $4.80 . . . no greater than you'd pay for the same quantity of unpacked connectors . . . and you'll save more than the cost of the Kit on the first few jobs.

MARWOOD LIMITED

Pacific Coast Distributors of Sherman "Wedge-Grips"

Note of Jobbers: *If you are out of stock we can usually make immediate shipment from warehouse stocks in:*

SEATTLE • PORTLAND • SAN FRANCISCO • LOS ANGELES

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PROFILES *of the month*

C. W. Goodwin, San Francisco manager, G-E Supply; Walter M. Boland, G-E Western region electronics manager, greet Stewardess Madelyn Miller, who brings from Bridgeport the first radio off G-E postwar assembly line

A. J. Turner (left), consulting engineer recently retired from Washington Water Power Co. after 31 years, and Vice-President J. E. E. Royer at the party WWP employees gave for Turner at Spokane City and University Club

At Northwest Electric Light & Power Assn. engineering and operating meeting in Portland: C. P. Osborne, Portland General Electric; S. B. Clark, Northwestern Electric, chairman code committee; E. H. Collins, Washington Water Power Co.

Also pictured at the NWEL&PA meeting were: A. L. Pollard, Puget Sound Power & Light, power production committee chairman; H. H. Schoolfield, Pacific Power & Light; John Bankus, Portland General Electric, chairman utilization committee. The story on page 110

NORTHERN CALIFORNIA ..hub of the Nation's fastest-growing market
How permanent is the West's industrial growth?
You've heard that the West had its war babies.
It did, but in a far smaller degree than you might have imagined. Actually, the greatest part of its spectacular wartime industrial and population expansion was solid growth.
And the West, always a premium market, will emerge from reconversion far richer, far better balanced than ever before.
In a recent poll of top Western management, for example, 48% of the key executives interviewed said they expected to provide more employment after the war than before, and only 5.6% said they would provide less.
Fully a third of these executives said their peacetime employment would be even larger than it was during the war.
In general 100 Westerners buy as much as 130 average Americans. Per capita income is higher in the West than anywhere in the country; per capita sales are $647 compared to a national average of $497.
If you are planning to open a business to serve this market and the billion customers who live in the lands around the great Pacific Basin, investigate the advantages of Northern California. The Pacific Gas and Electric Company will help you in every way possible.
P. G. and E. engineers will help you locate your plant
A well-trained Pacific Gas and Electric Company engineering staff has been built solely to help industrial firms learn the facts about locating in Northern California. This staff works closely with established agencies throughout the entire area, and its service includes at no charge...
A thorough study of available sites; photographs, maps, aerial perspectives.
Complete information on environment, transportation, drainage, trucking and freight rates.
Estimated cost of property, of any necessary improvements, of power and other utilities.
For more information, or assistance of any kind, write Pacific Gas and Electric Company, San Francisco 6, California.
Northern California...industrial center of the New Pacific World
PACIFIC GAS AND ELECTRIC COMPANY

The Nation's Fastest-Growing Market

—based on permanent industrial growth!

Northern California and the West have much to tell and show the Nation. In Northern California, particularly, the spectacular wartime industrial growth has been widespread and diversified. Yet this area has had few war baby industries to impede immediate re-conversion to its postwar economy.

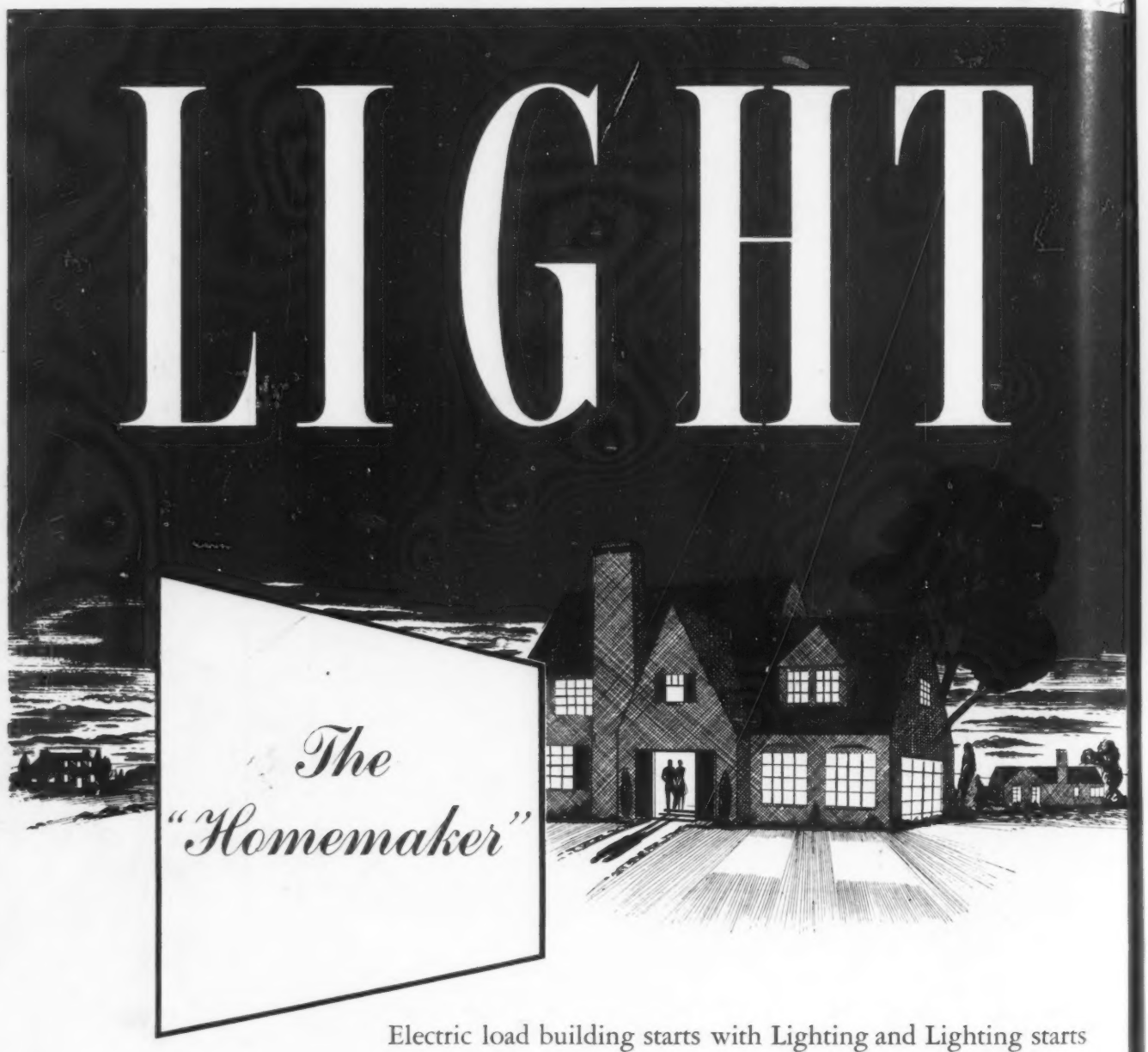
The industrial West and the potential markets surrounding the hub of Northern California are rich in opportunity.

Every community in Northern California has a stake in the busy future that is starting now. Business and industrial leaders in the East have many plans for Western expansion. Pacific Gas and Electric Company is working to help them and to help your community.

The advertisement reproduced above, is the second in a series of national advertisements to attract new business and industry to Northern California. This national advertising campaign reaches the more than 5,450,000 readers of—TIME, SATURDAY EVENING POST, WALL STREET JOURNAL, NEWSWEEK, FORBES and UNITED STATES NEWS.

E W 52X-1245

LIGHT



The "Homemaker"

Electric load building starts with Lighting and Lighting starts in the home. * The first general use of electricity was for domestic lighting. * Since the days when a few bare 15-candlepower bulbs supplanted the old kerosene lamp, home lighting has been the backlog of business for the utility company, the manufacturer and the dealer in fixtures. * Since then there have been innumerable improvements in the science of home illumination and the art of lamp and fixture manufacture. * The modern home, if correctly designed, is flooded with electric light scientifically applied. * Light makes it cheerful, comfortable and happy.

We recommend the promotion of *Light, the Home Maker.*

PACIFIC COAST ELECTRICAL ASSOCIATION

601 West Fifth Street, Los Angeles 13 * 447 Sutter Street, San Francisco 8